

# Railway Age Gazette

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The principal value of the International Engineering Congress, held in San Francisco last week, as far as railway men are concerned, lies in the character of the papers presented. The attendance at the meetings of the railway section was by no means representative of the railway engineers of the country, or even of the West, and the discussions on most of the papers were either perfunctory or entirely lacking. This does not imply, however, that the Congress was unsuccessful. On account of the vast scope covered by such international gatherings, the long periods that elapse between meetings, and the fact that all papers presented are written by individuals rather than by committees, it is not to be expected that the subjects will be handled in a manner that lends itself easily to discussion. The papers are essentially reviews of engineering practise and discussions of recent developments. For this reason, only brief abstracts have been taken

from most of them for use in the report published elsewhere in this issue. The complete volume of the proceedings of this section of the Congress will be valuable to many students of railway engineering both within and without railway organizations, but it is manifestly impossible for the *Railway Age Gazette* to do more than suggest the nature of the material that will be available in these proceedings when published.

In its opinion in the western freight rate advance case, the Interstate Commerce Commission left its attitude toward two

### Rehearing of the Western Rate Case

important questions very doubtful. It did not state its conclusion as to whether the western lines needed an increase in their net revenues, although both the railways and those opposing advances in rates asked it to do so. It also failed to make clear its position on the question of state interference with interstate commerce. It refused to grant certain advances in interstate rates on the ground that there were lower state rates fixed by state authorities; but just to what extent it intends to let state regulation control interstate regulation it did not make clear. The attorneys of the railways in their brief for a rehearing, an abstract of which is published elsewhere in this issue, present a masterly argument for the commission to make clear its exact position respecting these matters. It is to be hoped that the commission will decide to do this. It either believes, or it does not believe, that the western lines need larger net revenues, and it ought to answer them one way or the other, so that they may act accordingly. It either intends, or it does not intend, to let rates fixed by state authorities control it in regulating interstate rates, and it ought to enlighten the carriers on this point so that they may know definitely how they must proceed to get the relief to which they consider themselves entitled. Such decisions as that in the western case, which really decided nothing, leave the railways in a state of uncertainty which is bad for them, and bad for business in general; and regulation which produces such results does not command or deserve respect and confidence.

With the inclusion of the Missouri, Kansas & Texas the mileage of railways in the United States in the hands of receivers is

### 42,000 Miles of Railway in Receiverships

now greater than it has ever been before. According to the *Railway Age Gazette's* record, the addition of the 3,865 miles of the Missouri, Kansas & Texas system makes a total of 82 railways, operating 41,988 miles of line, and with a total capitalization of \$2,264,000,000, now being operated by receivers. This is more than one-sixth of the railway mileage in the United States, and exceeds the total railway mileage of any other country in the world except European and Asiatic Russia combined. The total par value of securities outstanding of roads being operated by receivers represents about 15 per cent of the total capitalization of the railways of the United States, and is greater than the total capitalization of all the railways of any other country in the world outside of Russia, Great Britain, Germany and France. This is a record of insolvency unparalleled in history. The largest mileage of roads in receiverships previously recorded, according to the Interstate Commerce Commission's reports, was for the fiscal year ending June 30, 1894, when 192 roads, operating 40,818 miles of line, and with a capitalization of about \$2,500,000,000 or about 25 per cent of the total capitalization at that time, were being operated under the direction of the courts. It will be noted that with a greater mileage the capitalization of the roads now in receiverships is less than that of the roads bankrupt in 1894. The proportion of the total mileage in receivers' hands in 1894 was not quite one-fourth. The large mileage of roads in the hands of receivers in that year was, of course, accounted for principally by the effect of the panic of 1893, 126 of the roads that were insolvent on June 30, 1894, having become so during the fiscal year, and 35 during 1893. At the end of the fiscal year 1895, there were 169 roads

in receiverships, operating 37,855 miles and having at total capitalization of \$2,439,000,000, and on June 30, 1896, 151 roads, with a mileage of 30,475 and a capitalization of \$1,742,000,000. The present large mileage is made up chiefly of roads that have gone into receiverships comparatively recently.

A practical and startling demonstration of what may be accomplished by giving special attention to the training and coaching

**A  
Remarkable  
Record**

of employees in the right way of doing their work, and of securing their hearty co-operation in seeing that it is done in that way, has taken place on the St. Louis & San Francisco during the past year.

The campaign on that road to reduce loss and damage to freight, which was purely educational in character, was described in the *Railway Age Gazette* of April 9, 16 and 23. The aim was to save \$200,000 during the fiscal year. The auditor's figures, which are now available, show that while the gross freight revenue for 1914-15 was \$28,182,181, as compared with \$28,654,454 for the previous year, a falling off of 1.7 per cent, the freight loss and damage claim payments dropped from \$482,038 to \$277,801, making a saving of \$204,237, or 42.4 per cent. If the gross freight revenue had not fallen off, and if the same rate of loss and damage applied, the saving would still have been over \$200,000. In 1913-14 the claim payments per thousand dollars of gross freight revenue amounted to \$16.82 on the Frisco, or about the average for all of the railroads in the country. For the year 1914-15 this figure dropped to \$9.86, a record which is equaled by very few other roads. During the year 22,905 freight claim preventive postals were turned in to the various committees, each one calling attention to some feature which was thought to be defective and which needed correction in order to remove the danger of further loss and damage. The slogan for the present fiscal year is another reduction of \$100,000 in freight loss and damage-claim payments.

#### THE MISSOURI, KANSAS & TEXAS RECEIVERSHIP

ON Monday of this week C. E. Schaff, president of the Missouri, Kansas & Texas, was appointed receiver in a suit brought by creditors with the acquiescence of the board of directors. The receivership was not the result of the failure of the operating department to make good; neither was it directly the result of such financial mistakes as were made in the cases of the St. Louis & San Francisco and the Chicago, Rock Island & Pacific. The company has strong banking support and the faith of the holders of large blocks of its securities. In 1913 it was able to sell \$19,000,000 secured two-year 5 per cent notes and the greater part of these notes was taken by bankers and financially strong individuals. The notes fell due May 1, 1915. Eventually 95 per cent of them, representing all of the notes held by those who were in a position to know the condition of the company, were extended. Active work has been done on a plan for a reorganization of the company's finances and the strong banking interests of J. & W. Seligman & Co. and Hallgarten & Co. have been secured for the carrying out of this plan.

The direct cause of the receivership is apparently that the suits brought by the holders of five per cent of the notes which matured May 1 last threatened the interests of other creditors and the integrity of working capital. While presumably the Missouri, Kansas & Texas reorganization will not be by any means as drastic as that of the Missouri Pacific, the receivership is another instance where voluntary reorganization of a fundamentally sound, although over-bonded, railroad could not be worked out even when banking support was available. It is easy to argue that it would be far better for all concerned to avoid the expense of receivership and submit to a voluntary reorganization and certain sacrifices, but the only instances where such theoretically wise self-interest can be put into practice is where a very large majority of securities are held by a few strong interests, as has been the case with the Western Maryland.

The holders of the five per cent of the 5 per cent notes which were not extended, by insisting on payment in cash and refusing to make a temporary sacrifice which the holders of many times that number of notes are willing to make, act in a selfish way, but there are always certain classes of lawyers and their clients who take a chance of making a profit by holding out on any proposition which requires an abatement of the letter of their legal right.

The Missouri, Kansas & Texas mortgages securing the bonds underlying the consolidated mortgage so restrict financing that the consolidated mortgage is necessarily a complicated structure superimposed on other mortgages, and although some such arrangement was absolutely necessary, it does not permit of as cheap financing as the earning power of the property deserves. There is, moreover, too large a proportion of Missouri, Kansas & Texas funded debt to stock.

Of course the Missouri, Kansas & Texas had extraordinarily bad luck in the fiscal year ended June 30, 1914. Unprecedented floods caused both expensive interruptions to traffic and expensive replacement work. Even so, however, the operating economies this past year have been such as to show a net operating income for the year ended June 30, 1915, of \$7,192,000, or more than 19 per cent greater than that for the year before, and a surplus of \$1,475,000 after the payment of interest charges will be shown for the year.

The indirect and underlying causes of the Missouri, Kansas & Texas receivership are the restrictions placed on economical financing by the mortgages prior to the consolidated mortgage; the confiscatory policy pursued for years by the legislature of Texas toward Texas railroads, which attitude, however, has been in good measure abandoned; vicious restrictions of the southwestern states under the form of regulation; rates which were too low either because of competition or of nibbling by state commissions, and failure years ago to develop a northbound low grade traffic, such as the timber which some of the other southwestern roads have.

The receivership will permit the elimination of the mortgage restrictions and presumably a reduction in fixed charges. The attitude of the state of Texas, as mentioned above, has already changed materially and the Missouri, Kansas & Texas management has gone far toward gaining the confidence of Texas people, and steps are already under way for the development of a profitable traffic northbound. What the rate situation in the southwest will be is only a matter of conjecture. It would seem as if the time had almost come when people had begun to realize the irreparable injury which was being done by demagogic railroad regulation.

#### TWO SYSTEMS OF STATE RAILWAYS

IN the report of the International Engineering Congress at San Francisco, which is published elsewhere in this issue, there are given abstracts of two papers which throw light on the question of government management of railways.

One is a paper on the railways of India, and indicates, as does most of the other available evidence, that the management of the state railways of that country has been successful. The article shows that these lines are profitable and other data might be cited indicating that, considering all the conditions, their capitalization is low, their service good and their rates reasonable.

The other paper referred to relates to the railways of Italy. Most of these lines are owned and operated by the government. Most of them always have been owned by it, although the state railways were leased to private companies from 1865 for varying periods of years, and again from 1885 to 1905. The author of the article on the Italian railways tries to show that government management since 1905 has been successful, or at least more successful than private management was.

Most people who are familiar not only with the results of the Italian railways in recent years, but also with their history, will be very slow to accept the view either that public manage-



ment of them has been a success or that it has secured better results than private management did. The writer of the paper in question shows that their net earnings are only about 1½ per cent on their capital cost. This net return fails by not less than \$35,000,000 a year to equal the interest which the government has to pay on the railway debt; and the government has been losing money at a proportionate rate ever since it assumed the management of the railways. Financially, therefore, the state railways are a failure. Furthermore, their service is still poor and their rates high.

For the reasons for the financial failure of the Italian railways we must go back to an era of railway building begun about a quarter of a century ago. At that time the government entered on an extensive campaign of construction which was extravagantly carried out, the result of which was that the lines built cost a great deal in excess of the original estimates. In one case contracts were let for 927 miles of line at \$50,300 a mile. The actual cost proved to be \$115,200 a mile. In 1879 the government provided for the construction of 3,762 miles, which it estimated would cost \$64,300 a mile. Nine years later an act was passed which recognized the probable cost of these lines, a large part of which had been built, as \$128,300 a mile.

The Italian railways when leased to private companies were burdened with the enormous capital cost resulting from wasteful government methods, and to this was largely due the failure of private management. Under government management since 1905 their capital cost has continued to increase at a rapid rate, and in 1913 it amounted to \$158,000 a mile, being exceeded by the capital costs of only two railway systems in the world—those of Belgium and the United Kingdom. Needless to say, the facilities provided and the traffic developed and handled are far inferior to those of the railways of Belgium and the United Kingdom. Measured by any rational standard government management of Italy has been a failure.

The inquiry naturally arises as to the reason or reasons for the difference between the results of state management in India and in Italy. The answer is at once suggested by the differences between the political conditions in the two countries, and the consequent differences between the organizations of the railways. India is not a self-governing country. It is ruled by a British civil service, the standards of honesty and efficiency of which are very high. The management of the state railways is in effect a part of this civil service. It is not influenced by politics of the "pork barrel" variety. It runs the railways on business principles.

On the other hand, the people of Italy are self-governing, although their government is monarchical in form. The management of the railways is under the control of parliament. In consequence their construction and operation always have been influenced by politics. Where new lines have been built, or improvements made, often has been determined by sectional

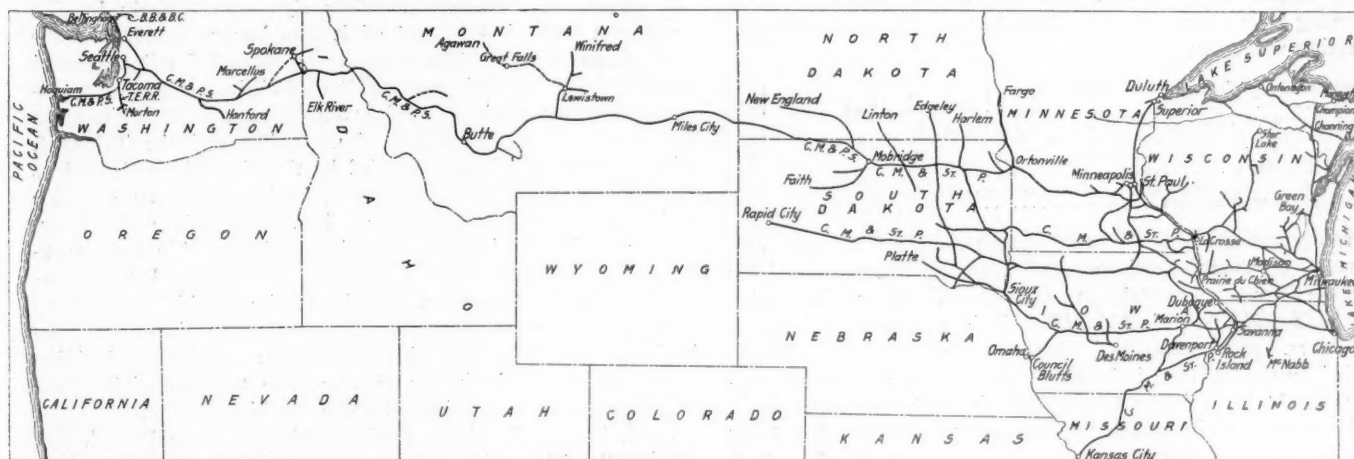
rather than national considerations. The employees of the state railways are organized, and their strikes and voting power have been important factors in determining the conditions and efficiency of the work done by them, and the wages they have been paid. These facts are not mentioned by the author of the paper presented at the Engineering Congress, but their truth is easily demonstrable by evidence from other reliable sources, and they afford the true explanation of the enormous losses inflicted by government railway management on the people of Italy.

The conclusion suggested by a comparison of state railway management and its results in India, on the one hand, and in Italy, on the other, is the same conclusion which is suggested by comparison of the management and results of the state railways of many other countries—of Prussia and of France, for example. This conclusion is, that the extent to which government management is a success or a failure is mainly determined by the extent to which politics is allowed to affect it. The more politics of the low, "pork barrel" kind there is in the government of a country, the more certain it is to fail as a manager of railways. Since there is as much politics of this kind in government in the United States as in any other country, the conclusion suggested as to the probable results of government management of railways here is obvious.

#### CHICAGO, MILWAUKEE & ST. PAUL

IT sounds paradoxical to say that the wisdom of the Chicago, Milwaukee & St. Paul Pacific coast extension was demonstrated in the fiscal year ended June 30, 1915, when the company failed to earn its 5 per cent dividend. Perhaps it would be more accurate to say that the necessity for the Pacific coast extension is being shown each year more clearly. The St. Paul, operating 10,053 miles of railroad, earned in the 1915 fiscal year \$91,435,000, or \$2,178,000 less than in the previous year. The expenses were reduced by \$919,000, and with heavier interest charges and a debit instead of a credit for hire of equipment, the company had net corporate income available for dividends of \$11,968,000, comparing with \$15,476,000 net available for dividends in 1914. Seven per cent dividends on the \$116,275,000 preferred stock and 5 per cent dividends on the \$117,361,000 common stock outstanding call for \$13,952,000. No attempt was made to scrimp on maintenance expenses in an effort to show the dividend as having been earned, and the, approximately, \$2,000,000 which was not provided by net income was taken from surplus. Past experience has proved almost invariably that it is a far sounder policy for a railroad company to frankly pay a part of its dividends from surplus if the company is strong enough to justify payment of dividends when not fully earned in a given year than to postpone maintenance expenditures in order temporarily to make a better showing in net.

Before the Pacific coast extension was built the St. Paul was



The Chicago, Milwaukee & St. Paul



easily earning 7 per cent on its then outstanding stock. It was a road, however, depending entirely on the traffic which it could originate on its own lines, or which was destined for points on its own lines, and it served a highly competitive territory. Competition is growing keener in the northwest every year. To get this competitive business it is often necessary to give a freight service and a passenger service that would not under normal conditions be justified by the traffic and rates. The St. Paul's competitors are the Northern Pacific; the Great Northern; the Minneapolis, St. Paul & Sault Ste. Marie; the Chicago, Burlington & Quincy, and the Chicago & North Western. The Hill Lines, of course, have their western outlet, the Soo has the Canadian Pacific, the Chicago & North Western has particularly close traffic relations with the Union Pacific. While, therefore, the St. Paul was apparently prosperous before it built to the coast, each year has shown the effects of the continually growing competition which the road has to meet and the impossibility of successfully meeting this competition and of reducing expenses, or rather of holding down expenses on local business.

Developing a new railroad is a slow process at best and requires a high degree of steadfast courage and even faith. The St. Paul's line from Mobridge, S. D., to Seattle and Tacoma, Wash., has been in operation since 1909. It is not even yet bringing to the system sufficient traffic to offset increased expenses of the rest of the system and to pay a fair return on the cost of its construction. The history of the transcontinental lines of the northwest, however, and the present development of that section of the country are such as to strengthen rather than weaken the belief with which the building of the Pacific coast extension was undertaken that in time it would be the salvation of the system.

The Hill Lines, the Soo and the North Western all feel the drain of competitive business in the territory east of the Missouri river. But these roads have built up also a through traffic which earns good revenue and can be handled economically. It would appear that it is the building up of a profitable through traffic, with resulting economies in transportation expenses, that will within a few years restore the earning power of the St. Paul, which has been adversely affected by conditions in the last four or five years. This is discussing the question, of course, as it affects the next decade of development of the property. The immediate prospects for large earnings this fall and winter from the movement of the unprecedented large crops apparently assure a prosperous year for 1916.

The falling off of \$2,178,000 in 1915 in operating revenues is less than what will be shown probably by a like mileage of most of the St. Paul's competitors. Revenue freight carried one mile totaled 8,186,000,000 tons, an increase of 1.32 per cent, but the revenue per ton mile was 7.813 mills in 1915, a decrease of 3.28 per cent as compared with the previous year. The number of passengers carried one mile was 858,500,000, a decrease as compared with the previous year of 5.91 per cent.

With only a very small falling off in freight traffic, there was a reduction in transportation expenses of \$1,151,000, the total transportation expenses in 1915 amounting to \$35,698,000. The following table shows the ratio of each class of expenses to total operating revenues:

	1915	1914
Maintenance of Way and Structures.....	11.35	11.45
Maintenance of Equipment.....	15.03	14.56
Traffic Expenses.....	1.92	1.92
Transportation Expenses.....	39.04	39.36
Miscellaneous Operations.....	0.79	0.83
General Expenses.....	2.04	1.78
Transportation for Investment—Credit.....	2.39	2.72
Total Operating Expenses.....	67.78	67.18

Transportation for investment—credit—is a subtraction from expenses representing a charge made by the company to itself for carrying company material. In 1915 the credit under this heading was \$2,183,000, in 1914, \$2,548,000. This looks rather large in both years, but as a matter of fact the amount of company freight carried by the St. Paul is large. The total ton mileage of company freight in 1915 was 1,439,000,000, in 1914, 1,597,000,000.

The average train load is not large, 390 tons in 1915 and 380 tons in 1914. In addition there was company freight which brought the total train load up to 459 tons in 1915 and 454 tons

in 1914. Such a large part of the St. Paul's traffic is local traffic, and so much of it has to be moved promptly without waiting for the opportunity to get a full train load, that, unless we remember what a network of branch lines the St. Paul has, we are apt to forget how difficult it is to make a good showing in train load when compared with a road having few branches and heavy through traffic on its main line. When the through traffic on the St. Paul becomes fully developed the train load figures should be very considerably higher than they now are. It will be noted that the company does a large passenger business. Of the total revenue, about 70 per cent is derived from freight and the other 30 from passenger and service incidental to passenger service. Both the quantity and the quality of the St. Paul's passenger business tend to make for a fairly high operating ratio. The St. Paul has the affection of travelers in the northwest and of citizens of St. Paul and Minneapolis to a remarkable degree. Even in the rather trying years through which the company has just passed the high standard of passenger service which the company has set for itself has been adhered to, and this policy, like that of refusing to stint on maintenance, leaves the company in a strong position to take advantage of better times.

The prospects for 1916 are bright. Never have there been such wheat and oat crops in the territory served by the St. Paul. Farmers of the Dakotas and Montana have cut an unheard-of crop of wheat and oats, and in some cases will probably get a bumper crop of corn also, although the frost probably will get some of the more northern corn. Hundreds of miles of land on which twelve bushels an acre of wheat was an average crop and twenty bushels a bumper crop have raised this year thirty to thirty-five bushels of wheat, and that planted to oats has raised 60 to 70 bushels per acre. The wheat has only barely started to move, so that the monthly earnings since the close of the fiscal year have not begun in the slightest to reflect the revenue which the road will earn from this year's crops. The less direct result which will come because of the traffic created by the prosperity of the farmers will be felt for two or three years.

The following table shows the principal figures for 1915 compared with 1914:

	1915	1914
Average Mileage Operated.....	10,053	9,684
Freight Revenue.....	\$63,953,799	65,315,755
Passenger Revenue.....	17,952,428	18,961,225
Total Operating Revenues.....	91,435,374	93,613,700
Maintenance of Way and Structures.....	10,377,185	10,722,100
Maintenance of Equipment.....	13,737,535	13,625,096
Traffic Expenses.....	1,756,801	1,799,621
Transportation Expenses.....	35,697,961	36,848,934
Miscellaneous.....	722,635	778,716
General Expenses.....	1,862,939	1,664,079
Transportation for Investment—Credit.....	2,183,355	2,548,245
Total Operating Expenses.....	61,971,701	62,690,301
Taxes.....	4,746,721	4,106,557
Operating Income.....	24,716,952	26,606,555
Gross Corporate Income.....	28,366,665	30,081,656
Net Corporate Income.....	11,968,283	15,476,286
Dividends.....	13,951,711	13,928,976
Surplus.....	*1,983,428	1,547,310

\* Deficit.

## HOCKING VALLEY

THE Hocking Valley was formerly owned jointly by five trunk lines, but control of it was bought in 1909 by the Chesapeake & Ohio. The company operates 352 miles of road running from the Ohio coal fields to Toledo. It has outstanding \$11,000,000 stock, of which the Chesapeake & Ohio owns \$8,825,800. A part of the Hocking Valley and the Toledo & Ohio Central, which is controlled by the New York Central, is operated as a double-track system, loads moving on one line and empties returning on the other. Heretofore the interchange of freight between the Chesapeake & Ohio and Hocking Valley has been over the Kanawha & Michigan, but, as mentioned in the comments on the Chesapeake & Ohio's annual report, printed in this issue, the Chesapeake & Ohio has sold its half interest in the Kanawha & Michigan and is now building an extension which, in conjunction with trackage rights, will give it a direct connection with the Hocking Valley.

Most, if not all, of the roads running north and south and serving the lakes will probably show a falling off in earnings due to the business depression of last year. In the case of the



Hocking Valley this was probably made worse by the fact that the Chesapeake & Ohio was shipping so much coal east that it sent as little as it conveniently could over the Kanawha & Michigan to the Hocking Valley.

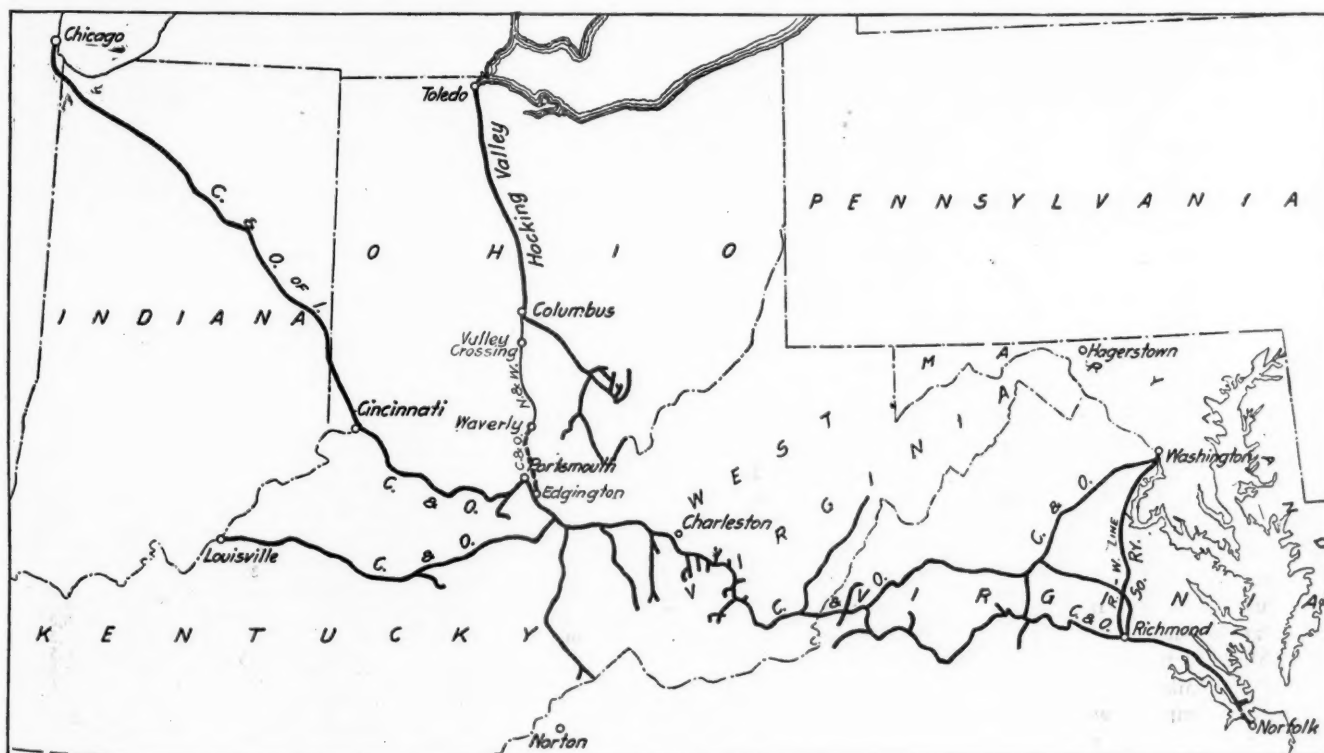
Total operating revenues of the Hocking Valley in 1915 amounted to \$6,181,000, a decrease as compared with the previous year of 12 per cent. Total operating expenses amounted to \$4,184,000, a decrease of 12.9 per cent. After the payment of rentals, taxes and interest there was \$493,000 available for dividends as compared with \$956,000 in the previous year. Dividends of 4 per cent were paid in 1915 as compared with 8 per cent in the previous year.

The principal reductions in operating expenses were in maintenance of equipment, on which there was spent \$1,159,000, or 20.7 per cent less than in 1914, and transportation expenses, which amounted to \$2,035,000, or 14.9 per cent less than in the previous year. The average revenue trainload in 1914 was just 1,000 tons, and even this high trainload was increased in 1915 to 1,035 tons. Including company freight, the trainload in 1915 was 1,068 tons, and the tons per locomotive, 922. With a decrease of 10.9 per cent in revenue ton mileage there was a

Taxes .....	\$418,522	\$451,136
Net operating income .....	1,578,261	1,763,263
Gross corporate income .....	1,871,152	2,215,182
Net income .....	493,402	955,741
Dividends .....	439,980	879,960
Surplus .....	53,422	75,781

#### CHESAPEAKE & OHIO

A CONDITION of the sale of \$33,000,000 Chesapeake & Ohio notes in 1914 was that \$2,000,000 should be spent from income for additions to the property in the fiscal year ended June 30, 1915; \$3,000,000 in the next year, and \$4,000,000 in each of the next three succeeding years. After the payment of 1 per cent dividends the company had a surplus for the year ended June 30, 1915, of \$2,036,000. From this amount and current funds there was spent a net total of \$3,024,000 on additions to road and equipment. No securities were sold during the year and the amount of outstanding equipment trust certificates was reduced from \$8,382,000 at the beginning of the year to \$6,413,000 at the end of the year. It will be seen, therefore, that the company not only spent somewhat over the required \$2,000,000 from this year's income, but about a million from the income of other years for additions and betterments.



The Chesapeake & Ohio and the Hocking Valley

decrease of 13.9 per cent in freight train mileage, while there was an increase in the percentage of empty car mileage from 43.8 in 1914 to 44.7 in 1915. The average length of haul on the Hocking Valley for freight was 129 miles in 1915 as against 125 miles in the previous year.

At the end of the year the company had on hand \$833,000 cash, with loans and bills payable of \$1,100,000. Since the close of the fiscal year the company has been showing a very considerable increase in business.

The following table shows the principal figures for operation in 1915 compared with 1914:

	1915	1914
Average mileage operated.....	352	352
Freight revenue .....	\$4,912,982	\$5,601,382
Passenger revenue .....	832,733	910,311
Total operating revenue .....	6,181,153	7,021,145
Maintenance of way and structures.....	707,207	668,455
Maintenance of equipment.....	1,158,671	1,460,653
Traffic expenses .....	110,916	107,576
Transportation expenses .....	2,033,491	2,391,640
Miscellaneous expenses .....		1,483
General expenses .....	172,602	175,422
Total operating expenses .....	4,184,370	4,803,747

It may be recalled that the Norfolk & Western's operating revenues for the fiscal year ended June 30, 1915, were about 3.73 per cent less than in the previous year. The Chesapeake & Ohio's operating revenues on the other hand were 5.35 per cent greater in 1915 than in the previous year, and totaled in 1915, \$39,464,000. By far the greater part of this gain in revenues was from the transportation of coal and coke. The total revenue tonnage of coal and coke in 1915 was 21,326,000, an increase over the previous year of 10.8 per cent. On June 1, 1914, the new coal pier of the Chesapeake & Ohio, at Newport News, was put in operation. The Chesapeake & Ohio was the last of the three roads running from West Virginia coal fields to Norfolk to build a steel electrically-operated coal-dumping pier, both the Virginian Railway and the Norfolk & Western having had piers in operation in 1914. The comparison of coal tonnage in 1915 and 1914 on the Chesapeake & Ohio, therefore, should be made with the explanation that in 1914 the Chesapeake & Ohio was probably not getting the proportion of export coal business to which it would have been entitled had it had facilities equal



to its two competitors. The Chesapeake & Ohio had also added to its coal car equipment previous to June, 1914, so that it was in a strong position to promptly move the coal of the operators on its lines, thus enabling them to take full advantage of the demand which the war has created for export coal.

With the present activity in the iron and steel trades and Canadian manufacturing plants there will be a large increase in movement of coal west and northbound from West Virginia. The Chesapeake & Ohio's average ton-mile rate on coal is but 3.06 mills. On some of this which moves west and which is now being delivered to the Kanawha & Michigan for haul over the Hocking Valley to the lakes the Chesapeake & Ohio gets a short and expensive haul. It may be recalled that arrangements were made in 1914 for the sale of the Chesapeake & Ohio's half interest in the majority stock of the Kanawha & Michigan. This sale was made at a profit to the Chesapeake & Ohio of \$1,119,000. A subsidiary company is now building a line from Edgington, Ky., to Waverly, Ohio, about 30 miles. At Waverly connection will be made with the Norfolk & Western over which trackage rights have been secured to a connection with the Hocking Valley, at Columbus, Ohio. The Hocking Valley is controlled by the Chesapeake & Ohio through ownership of the majority of its stock. This new connection will give the Chesapeake & Ohio a haul of two to three times as long on its coal for Toledo as it has when it delivers to the Kanawha & Michigan. Since the expense of loading, making up trains, etc., will be the same, the profit on the business will be very greatly increased when the new line is completed.

The net income available for dividends and for improvements to the property under the terms of the note sale in 1914 mentioned was \$2,664,000 in 1915, as compared with \$2,972,000 in the previous year. In 1915 only one per cent was paid in dividends, while in 1914 four per cent was paid. The 1915 net would have been much larger except that in 1915 the Hocking Valley paid only 4 per cent dividends on the \$8,825,800 stock which the Chesapeake & Ohio owns, whereas in 1914 eight per cent was paid by the Hocking Valley. This alone makes a difference of more than \$350,000, and the company spent about one million dollars more on maintenance in 1915 than in 1914.

Transportation expenses amounted to \$12,896,000 in 1915, an increase over the previous year of \$364,000, or 2.9 per cent. The total revenue ton mileage was 8,138,000,000, an increase over the previous year of 1,074,000,000, or 15.2 per cent. The passengers carried one mile totaled 269,000,000, as against 292,000,000 the year before, a decrease of 7.6 per cent. Freight train mileage totaled 8,979,000, an increase of 680,000, or 10.6 per cent, and the passenger-train mileage totaled 5,009,000, an increase of 222,000, or 4.2 per cent. The average revenue train-load freight in 1915 was 906 tons and in 1914 870 tons, an increase last year of 4.1 per cent. The gain in trainloading was made entirely through a heavier gross load pulled per locomotive, the average number of loaded cars per train being 28 in 1915 and 28.1 in 1914, while the average number of empty cars was 19.4 in 1915, as against 17.7 in 1914. The average load per loaded car was 32.3 in 1915 and 30.9 tons in 1914.

The total tonnage of all commodities carried on the Chesapeake & Ohio in 1915 was 30,048,000. Of this, 70.25 per cent was bituminous coal, 6.40 per cent lumber, and 3.92 per cent grain. The principal changes, as compared with the previous year, were an increase of more than 12 per cent in tonnage of bituminous coal; an increase of more than 140 per cent in tonnage of grain, and a decrease of nearly 14 per cent in the tonnage of lumber. There was also, of course, a big increase in the tonnage of livestock, probably principally horses, the total tonnage in 1915 being 106,000, as against 46,000 in the previous year.

The company spent \$4,695,000 in 1915 for maintenance of way. This is an increase of \$545,000 over the previous year, or a little over 13 per cent. By far the largest single item of increase was the expenditure for ties, a great deal of tie renewal work having been done this last year. The amount spent for ties in 1915 was \$2,136,000, an increase as compared with the previous year of \$513,000. There was also, of course,

the expenditure for maintenance of the new coal pier, which amounted to \$105,000, in 1915.

Maintenance of equipment cost \$8,243,000, an increase over the previous year of \$415,000. The average repairs per locomotive amounted to \$3,013 in 1915, and \$2,740 in 1914; the average expenditure for repairs of freight-train cars was \$82 in 1915, and \$74 in 1914; and for passenger-train cars, \$921 and \$909, respectively. Of the total locomotives and freight cars in service 11 per cent of each were awaiting or undergoing heavy and general repairs at the close of the year. This seems a rather high percentage.

The prospects for the present year are that there will be a further increase in coal traffic eastbound and a very much increased coal traffic westbound and northbound. Passenger business also ought to be better, and the Hocking Valley's prospects for a good year, as mentioned elsewhere, are good.

The following table shows the principal figures for operation in 1915, compared with 1914:

	1915	1914
Average mileage operated.....	2,369	2,346
Freight revenue .....	\$31,288,537	\$28,866,516
Passenger revenue .....	5,696,088	6,098,059
Total operating revenue.....	39,464,037	37,459,864
Maintenance of way and structures.....	4,694,522	4,149,457
Maintenance of equipment.....	8,243,170	7,827,660
Traffic expenses .....	650,406	669,283
Transportation expenses .....	12,896,079	12,532,329
Miscellaneous expenses .....	232,347	248,347
General expenses .....	873,883	986,822
Transportation for investment—Cr.....	33,994	.....
Total operating expenses.....	27,556,414	26,413,899
Taxes .....	1,349,497	1,330,935
Net operating income.....	10,558,126	9,715,030
Gross income .....	11,576,346	11,859,681
Net income .....	2,663,537	2,971,815
Dividends .....	627,816	2,511,264
Surplus .....	2,035,721	460,551

## NEW BOOKS

*Poor's Manual of Industrials for 1915.* Bound in cloth; 2,872 pages; size, 6 in. by 9 in. Published by Poor's Manual Company, 80 Lafayette street, New York. Price \$5.

The sixth edition of Poor's Manual of Industrials contains 412 more text pages than the fifth or 1914 edition, the increase resulting from the inclusion of a large number of new statements of industrial companies presented for the first time in manual form. Poor's Manual Company now issues three manuals. The Manual of Railroads has been issued for 49 years and has long been recognized as an authority. Of the Manual of Public Utilities but three editions have been issued, and of the Manual of Industrials the present volume is the sixth. The last relates primarily to manufacturing, mining and miscellaneous companies and contains 2,872 pages, being the largest of the three. It contains information relative to the capital stock, directors and officers of the various companies and also, when such are obtainable, income accounts, balance sheets and other important data, all of which would otherwise be almost inaccessible. One of its valuable sections is the Railroad Appendix, containing data of railroads and utilities received too late for publication in the other two manuals.

*Oxy-Acetylene Welding and Cutting.* By Calvin F. Swingle, M.E. 190 pages, 4½ in. by 6½ in. Illustrated. Bound in leather or cloth. Published by Frederick J. Drake & Co., Chicago. Price, \$1.50 in leather; \$1.00 in cloth.

This book is intended as a practical treatise on the subject of welding and cutting with the oxy-acetylene flame, and only so much of the theory pertaining to the subject has been included as will enable the practical man to acquire a thorough working understanding of the subject. After an introductory chapter dealing briefly with the adaptability of various methods of welding, several chapters are devoted to welding flames and the properties and methods of handling the gases most commonly used. This portion of the book is confined largely to the oxy-acetylene flame, which has the widest practical application, and touches only briefly on other gases which have been used with oxygen to a less extent in welding and cutting operations. The equipment used in welding and cutting is next discussed, after which the operation of the plant and the practices followed in welding and cutting are taken up. A final brief chapter is devoted to the subject of carbon removal with the oxygen torch. The book contains a large number of illustrations and a number of tables.



# Railways Ask Rehearing of Western Rate Case

## Request Specific Findings on Adequacy of Carriers' Revenues and Relation of State and Interstate Rates

The committee of attorneys, representing the western railways, of which C. C. Wright, general solicitor of the Chicago & North Western, is chairman, on September 25 filed its petition with the Interstate Commerce Commission, asking the commission to grant a rehearing and reargument of the western rate advance case and to modify the findings and order of July 30, in regard to the following particulars:

As to the request of the respondents and protestants for a finding by the commission upon the question of the adequacy of the revenues of the carriers. Upon the reasonableness of the proposed rates on grain and grain products, livestock, packing house products, fresh meats and hides (except as the same were allowed), fertilizer and fertilizer materials and cotton piece goods.

The respondents pray that the findings in the order be modified so as to permit the carriers to make effective the rates in the tariffs directed to be cancelled, and that if there is, in the opinion of the commission, evidence raising a serious question as to the proper relation of the state rates to the proposed rates, then that the commission shall order an investigation as to the relation of such state rates to interstate rates, in which the relation may be properly determined by the commission, and may allow the petitioners to establish such rates as are in its opinion just and reasonable, and require the carriers to remove any discriminations which may be found to exist by reason of lower state rates.

### REASONS FOR A REHEARING

The following is an abstract of the statement of the carriers as to why they are entitled to a reargument and to a modification of the opinion:

There are some things in the opinion of the commission in this case which are so vital, not only as affecting the advances proposed, but also as affecting the ultimate welfare of the railroads and of the public, that we do not hesitate to ask this commission to reopen the case that they may be more fully presented. With a record of more than 15,000 pages and the voluminous exhibits contained in this case, it is not at all strange that the members of the commission who did not hear the testimony should fail to gather its full import, and what may be said in criticism of the opinion is not in criticism of the actions of individual members of the commission. We desire, however, to speak plainly as to the effects of this opinion, both upon the transportation problems of this country and upon the future of this commission. The almost unlimited power of the commission makes it imperative that it shall most carefully consider and weigh the effect of its opinions upon so important questions as those here raised. In view of the fact that there is no adequate review of the commission's opinion, it is the more proper that reargument of the questions be granted.

### THE NEEDS OF THE CARRIERS FOR ADDITIONAL REVENUE

The rules of the commission recently adopted required that the parties to a proceeding before it shall state distinctly the findings which are desired. The carriers in their brief specifically asked for a finding upon the sufficiency of the revenues of the carriers. The principal brief for the protestants also contains a request for a finding on this subject. The first paragraph of their brief is as follows: "Are western railroads entitled to more revenue through advanced freight rates, is the issue presented in this case?" It will thus be seen that this issue was specifically joined. Elaborate proof was introduced by both sides. It is a question which is important alike to the railroads and to the public to know what the policy of this commission is to be.

A few pertinent facts may properly be called to the attention of the commission as bearing upon this question. In 1910 various carriers undertook some general advances in rates. In the opinion in the eastern case, it is pointed out that the question presented was the need of additional revenue. In the western freight advance case it was held that the revenues must play a not inconsiderable part in arriving at a final judgment, and the commission epitomized the grounds of justification of the advances in the phrase: "We need the money." It is true that in both cases the commission held that the carriers had not shown the inadequacy of their revenues. It is, however, noteworthy that the commission in those cases not only distinctly passed upon the issue presented in this case, but that it said to the same carriers that now appear before the commission that if in the future they felt their rates were not sufficient to give an *adequate return*, they would find the door of the commission open to them. This implied a promise on the part of the commission that they would at such future time pass upon that question.

In the entire history of the commission, so far as we are able to determine, from that time since, there has never been any indication of a change in the views of the commission. Certainly there has been no change in the law. On the other hand, in the recent so-called five per cent case, the eastern carriers renewed their application for an increase in rates, based solely upon the need of additional revenue. The commission in that case, as now constituted, considered the question and rendered its decision based upon its conclusions as to the need of additional revenue.

We recognize that it does not necessarily follow that a particular rate has been justified by a showing that the revenues of the carriers are insufficient. However, the fact of the insufficiency of revenue is one of the fundamental questions which underlies and must underlie a general advance in rates. The western carriers did not base their claim *entirely* upon the inadequacy of revenues, but they harkened to the advice of this commission and introduced evidence of the comparative returns upon various commodities.

In every other general advance rate case the commission has not only considered but has passed upon the question of the sufficiency of revenues, and the carriers in this case therefore ask that that matter may be distinctly passed on. It is important to the carriers and to the public to know the conclusion which the commission arrived at upon this question. If the commission shall find that the present revenues are adequate, then the railroads and the public must adjust themselves to the service which will allow the carriers from those revenues to secure the fair return guaranteed by the law. The public likewise is interested in this matter, as, depending upon the permanent policy of this commission may ultimately depend the question of whether railroads shall continue to be operated by private capital under efficient government regulation and control, or shall be operated by state and governmental authorities.

### THE FINDINGS OF THE COMMISSION

Many of the facts upon which the conclusion as to the adequacy or inadequacy of revenues must rest have been determined. It was found, among other things, that the carriers are required to pay a higher average percentage for borrowed capital than heretofore; that they are paying higher prices for many materials and higher wages for most kinds of labor; that in meeting the increased cost with increased prices for service they are subject to certain disabilities not similarly encountered by many other industries; that the relative equal

depreciation of the carriers' credit with credit generally is not evidence of the adequacy or inadequacy of their present revenues (it should be noted that the carriers never contended that it was); that their net corporate income cannot be accepted as the measure of the adequacy or inadequacy of present rates (the carriers did not so contend and did not present the data as to net corporate income); that the increased percentage of bonds to capital obligations indicates a growing disinclination to invest in railroad stocks and a growing unwillingness to accept the prospect of dividends as a sufficient incentive to assume the risk of railroad proprietorship. It also found that the relative profitableness of the business, taking the roads as a whole, has declined since 1901; that the main cause effecting this result has been an increase in expenditure not offset by an increase in receipts.

The tables presented beyond question show that the same statement is true comparing 1910 with present conditions. It may be said generally that the contentions of the carriers in this case as to the financial needs and the basis upon which they should be determined have been sustained by the commission with the possible exception as to the value of the roads. The operating ratio is found to have increased materially. The substantial integrity of the carriers' accounts has been approved. The fact of the decreasing net return from operations is shown to be due to the increased wages and taxes and maintenance, and to be from causes beyond the control of the carriers. Every fact that was found in the five per cent case by the commission upon which it based its conclusion that the carriers needed additional revenue has either been found in the present case by the commission or is supported by uncontradicted testimony. Parallel columns of the findings and results of the findings as between the five per cent case and the present case demonstrate that the showing in this case is clearer and upon a more substantial basis than that presented in the five per cent case. The needs of the carriers are shown to be greater and the insufficiency of the revenue is more marked.

Inasmuch as the opinion refers to certain returns upon stock of some of the carriers, we direct the commission's attention to the fact that the carriers presented their case upon the *operating* income from the property devoted to the public service and not upon the *corporate* income as compared with the capitalization. That this test is not a test of the adequacy or inadequacy of revenues, the commission has held. If a test is to be made of the corporate income as compared to the capitalization, or the return upon the stock of the company, then the question of the financial management of various carriers would become a much more important element than when the *railway operating income* and the value of the physical property is considered. The injury from financial mismanagement is primarily and directly to the stockholders and bondholders of the carriers. It is, we believe, however, a very small element when the *operating* revenues are compared to the value of the property. To put the matter more concretely, if it were conceded that a road had been financially mismanaged, it would not in any way affect the amount of commodities to be moved upon that road. The present case includes not the single road but all of the roads. The commodities which were handled by these roads were exactly the same, whether the one line of road or all of the roads had been financially mismanaged. If there had never been in times past a dollar misspent by any of the roads it would not in any particular affect the gross revenues to be derived by the carriers in this section, as that must depend upon the amount of commodities and the rates charged. The effect upon the *operating* revenues would therefore be nil. Its effect upon the *net operating income* could only be predicated upon the fact of mismanagement of the *property*, not its *finances*, or upon *unlawful expenditures which were charged to operating costs*. In the present case there is no evidence to indicate that the *property* of any of these roads has been mismanaged. The operating ratios on the Rock Island, which has been recently criticized by the commission, are shown to be

substantially the same as on other lines in that section. There is no evidence in this case of any improper charges against the operating expenses since 1902. The carriers did not present this case to the commission upon the claims of roads that were in the hands of a receiver, or upon the claim that the roads were entitled to any definite rate of return from *corporate income*. It was and is contended that the net operating revenues are insufficient to allow a return upon the value of the properties equivalent to what the courts have said is the lowest level of reasonableness.

It is needless to point out to this commission that this case is one of a series involving other commodities, and involving passenger rates. The same question must be before this commission in all of those cases, as it has been stipulated that this record shall be a part of the record in the other cases. This makes it appear to be very proper that we ask that this case be reopened, and that the opinion may be modified in the light of a reargument and the arguments which shall be presented in those cases.

#### A NEW DOCTRINE

Overshadowing all questions of the amount of revenue involved, there arises the question of whether this commission shall surrender the power and duties of the federal government which Congress has reposed in the commission. We believe that the announcement of the commission in this case as to its policy as to advance rates where there are lower state rates is the most startling one that has ever come from the commission. We put the matter strongly and desire to make our views as plain as possible. It must be that we misunderstand the opinion, or the opinion is the result of an entire misconception, both of the law and the facts.

The commission has in the past repeatedly held that there was no greater presumption attaching to state-made rates than attaches to the voluntary rates of carriers. State-made rates may be introduced for comparative purposes the same as voluntarily-made rates. They are evidential in character and not controlling.

In the now celebrated Shreveport case, which was affirmed by the Supreme Court of the United States, this commission established the doctrine that it is the duty of the Interstate Commerce Commission to determine *for itself the reasonableness of interstate rates*. When reasonable interstate rates have been determined by the Interstate Commerce Commission, it has the jurisdiction to determine whether lower rates, established by a carrier voluntarily or by a carrier under the direction of the state authorities, are unjustly discriminatory. This commission never assumed the right to consider or determine in any way the reasonableness of state rates as such. The Supreme Court fully sustained the commission, and in substance said: The paramount rights in relation to determining the reasonableness of interstate rates is in the Interstate Commerce Commission and this commission has the power, and, when its jurisdiction is invoked, must exercise the duty of determining whether lower rates fixed under an order of the state discriminate unjustly against the interstate shipper. When such determination has been made by the Interstate Commerce Commission, the law says to the carrier, you may remove that discrimination, even if by so doing you charge higher rates than fixed by the state authorities for the movement within the state.

For the purpose of the discussion of this particular question, if it be conceded that every state rate was lower than the interstate rate, it could not affect the reasonableness *per se* of the interstate rate. In the eastern advance rate case and in the western advance rate case, the commission held that its duty in passing upon an increased rate is identical with its duty in passing upon the reasonableness of a rate when complaint has been made. The only effect of the amendment to Section 15 of the act giving the commission the power to suspend rates was to allow the commission to determine in advance of the effective date of the rates the same questions which it must determine if the rates had gone into effect and a complaint been made



as to their reasonableness or discriminatory character. If it be, however, the doctrine that in an advance rate case the carriers must assume the burden of showing that the lower state rates are unreasonable, then the commission would be called upon to exercise jurisdiction over state rates and to determine a matter which has not been committed to the commission. We direct particular attention to the Shreveport case. Whatever may have been the individual opinions prior to that decision, it is now the law upon the subject of the duties and powers of this commission. The commission found the commodity rates enforced on the railroads from Shreveport to be just and reasonable and that there were lower rates on the same commodities carried from Texas points under similar conditions. The commission did not say because there were lower rates carried in Texas therefore you must reduce your interstate rates. It did say that the commission, acting as the representative of the federal government, must determine, according to its judgment, the reasonableness of the interstate rates, and if the carriers by reason of the compulsion of some other body maintained lower rates which were discriminatory, the discrimination must be removed.

The Supreme Court appreciated the very lucid statement of the commission upon that subject. The court adopted the conclusion of the commission, that it was empowered and therefore it was its duty to determine the reasonableness of the interstate rates by standards of its own.

AUTHORITY CONFERRED UPON THE COMMISSION IN PASSING UPON  
ADVANCED RATES PRIOR TO THEIR EFFECTIVE DATE

The commission, without the matter having been discussed in argument, and we believe without full comprehension of the effect of their statement, assumed that the use of the word "propriety" in Section 15 of the act to regulate commerce extends the authority of the commission so that it may go outside of the ordinary questions, which it may determine upon a charge that a rate is unreasonable and discriminatory, and determine the "propriety" of the rates. It is said, "Propriety is a broader and more inclusive term than reasonableness." Just what is meant is left uncertain in the opinion of the commission, but it evidently must be either the exercise of such judgment as the management of a carrier might exercise, or of that judgment which a purely legislative body might exercise. That it was not the intention of Congress to confer such power upon the commission, must be evident for various reasons. The commission has never so considered it heretofore. In the western rate advance case in 1911 the commission distinctly and positively disclaimed any other or different power in relation to a hearing upon suspended rates than it possessed in relation to rates under attack. It also stated that the commission was not the general manager of railroad companies. It seems clear that the duties delegated to the commission are not the purely legislative ones which must be involved in the determination of propriety of rates, if such determination is to be based on other than fixed rules. That Congress did not so intend, appears to be very plain from the context of the act. The word "propriety" is limited to a determination of the same matters which must be determined when a rate is attacked; that is, the unreasonableness and discriminatory character of the rates. To hold otherwise and extend the meaning of the word "propriety" to embrace the judgment of the commission upon outside matters other than the reasonableness or unreasonableness of the rates and the discriminatory or undiscriminatory character thereof, is contrary to all the canons of statutory construction.

If, however, a broad definition of propriety as being something other and beyond the fixed standards and rules is the meaning in this statute, then the statute itself is in violation of the provisions of the constitution that require the separation of the powers of government. The Supreme Court has distinctly passed upon such questions. The legislature cannot delegate its power to make a law, but it can make a law to delegate a power to determine some fact or state of things upon which

the law makes or intends to make its own action depend. The construction of the statute which makes "propriety" mean something broader than those terms included in the other paragraphs of the law would be such a delegation of legislative power.

Before the commission commits itself to a doctrine so subversive of the position which it has taken in all of its previous decisions, without the matter having been discussed in the hearing so far had, would seem to justify the carriers in a request that they have an opportunity to be heard upon the matter.

PROCEDURE WHEN STATE RATES ARE LOWER THAN INTERSTATE RATES

As before pointed out, it is the settled doctrine of the Supreme Court that the Interstate Commerce Commission *must determine the reasonableness of the interstate rates according to its standards and judgment*; that the Interstate Commerce Commission *is the sole judge of the relation which the state rate shall bear to the interstate rate*.

It therefore becomes important in considering an advance rate case to see by what method the Interstate Commerce Commission can fully discharge its duty. That it cannot so do by simply denying the carriers the right to establish rates, which are otherwise reasonable, solely because there are lower rates would seem to be apparent. To adopt that course is to allow the states to determine the relation of state and interstate rates. By this method, no advance on interstate rates to the reasonable basis determined by the Interstate Commerce Commission could be made until a similar advance was made in state rates. It appears in this case that the state rates on livestock and some other commodities are lower than the present interstate rates, and of course lower than the proposed interstate rates, and it becomes important to determine what course the commission should pursue in such case, if, in its judgment, the proposed interstate rates are reasonable. In relation to grain and grain products, a similar condition existed as to minimum weight on grain products. The interstate minimum is in many cases higher at the present time and it was proposed to make the interstate minimum still higher. In that case the commission approved of the increase in the interstate minimum and disposed of the very urgent claim of discrimination which was presented by the protestants.

In the matter of coal rates it is true that the proposed rates were higher than some state rates for a similar distance, and probably under substantially similar conditions, yet the commission permitted the advance in rates. The same condition that existed in relation to the minimum weights on grain products exists in relation to livestock rates. The rates in different states are different, and it would be impossible for the commission to fit the interstate rate to each state rate. "To do so would result in state regulation of interstate commerce."

The commission in this case, we believe, adopted the proper method in relation to minimums on grain products and to the rates on coal. As we understand it, this was in line with the previous course of this commission. The commission cited the Shreveport case and the St. Louis grain case as authority for the different course in livestock than was taken with relation to the grain products and the coal rates. Those cases were complaints as to existing rates, and there was directly put in issue the relation between state and interstate rates.

In an advance rate case that is not *directly* in issue. The carriers cannot bring it into the case. They file tariffs. These are suspended pending investigation. That suspension, however, gives no notice to a party using the state rate that the measure of his rate is to be investigated; and therefore it appears that in an advance rate case, the commission cannot determine the relation of the state to the interstate rates. Such apparently was its view in the establishment of the express rates, and particularly allowing an advance in the express rates when there are many lower state rates. There was before this commission and is now pending before it a case where the state-made express rates are so very much lower than the rates fixed by the Interstate Commerce Commission that carloads of posts

are being shipped by express at a less charge than the third class freight rates. Notwithstanding this complaint the commission allowed the advance in the interstate express rates. The evidence, on file with the commission in that case, will disclose that the discrepancies between the interstate express rates and the state express rates of South Dakota are even greater than the discrepancies between the interstate and state livestock rates. In view of the consistent course of the commission heretofore, the carriers ought not to have been expected to have met that issue or to argue it, and this rehearing is asked that they may have the advantage of an opportunity to discuss that question.

Again, in the five per cent case, the advances were allowed in spite of the fact that the state rates were lower. The fact that there might possibly be a discrimination affected by the putting into effect of interstate rates, reasonable in themselves, did not make it necessary to deny the interstate advances. That this course is eminently proper is illustrated by the fact that there is now pending before the Interstate Commerce Commission a complaint of the St. Louis Business Men's League versus the railroads in which they seek to remove the discrimination which was produced by this order of the Interstate Commerce Commission. The same course was pursued in relation to the express rates. Sioux City brought an action to remove the discrimination incident to the rates fixed by the Interstate Commerce Commission and the lower South Dakota rates.

#### REMEDY FOR STATE DISCRIMINATION AGAINST INTERSTATE COMMERCE

If the rates are otherwise just and reasonable, it would not seem to be improper to allow them to go into effect and to order the removal of any impropriety that may exist by reason of lower state-made rates. Upon the present basis as outlined by the commission, that could not be done. We suggest the proper remedy and ask that a hearing may be had upon it. First, the commission should pass upon the reasonableness and justice of the proposed interstate rates without regard to the relation to state rates. If, having found the proposed interstate rates reasonable, but that there were lower state rates which might be discriminatory, the commission should allow reasonable interstate rates to go into effect and proceed to an investigation of the relation of the state rates to the interstate rates.

It is not the thought of the carriers in this case that the evidence is sufficiently definite to warrant the commission in a finding of unjust discrimination as between state and interstate rates for the reasons hereafter set forth. For this reason and because it was not consonant with the prior practice of this commission, the carriers did not undertake such a task. It would require that they search their whole tariff records, and make negative proof as to a great many rates.

However, if the commission should find that the evidence is sufficient to show discrimination, it ought, either to *allow the advance rate to go into effect and order the discrimination removed*, or it should *allow the advance rate to go into effect and order a general investigation to determine the proper relation of the state rates to the interstate rates*.

We do not suggest the first of these courses because of the doubt as to the jurisdiction of the commission to make an order removing the discrimination in an advance rate case without having given definite notice that the relation of the state and interstate rates will be considered. The latter course would seem to be the one which is consonant with prior practice and with reason. The prior practice has not been to order a general hearing upon the relation of the state and interstate rates, but to await a complaint. If, however, there is sufficient evidence produced to the commission in an advance rate case of this kind to indicate that there is a serious question as to the propriety of the relation between the state and interstate rates which will become effective, the commission ought not to wait for the individual complaints.

We have presented in the motion a request that this be done. It is very apparent that as the matter is now left, assuming that the proposed livestock rates are reasonable, in and of themselves,

the carriers are effectually tied up so that they may never secure an advance in livestock rates unless they can be able to convince the commissions of some eight or more states. In other words, the Interstate Commerce Commission cannot permit the carriers to earn the fair rates upon interstate business unless the state commissions permit them so to do. The attitude of the state commissions in this case indicates the chance the carriers would have in such an undertaking. This would be a surrender of the prerogative of this commission, and allow the states to fix the relation of state to interstate rates. The course suggested above obviates this difficulty and maintains the power and authority of the Interstate Commerce Commission over interstate rates and the relation to state rates.

The least that could be done under such a condition, as we view it, would be to postpone the final determination as to allowing advance rates to go into effect until that general investigation of the relation of rates can be had.

What has been said in relation particularly to livestock rates would apply to packing-house products, fresh meats and some other commodities. We understand that the protestants in relation to coal rates have asked for a rehearing, and they ask that the doctrine applied to the livestock be applied to coal. As we view it, the commission took the proper course in relation to the coal rates, and the remedy of the protestants as to coal rates is not in a rehearing but in a complaint to remove the discrimination on account of lower rates.

(That portion of the petition dealing at length with the decision as to specific commodities is here omitted.—EDITOR.)

#### EFFECT OF THE DOCTRINE ANNOUNCED

We think that the only safe way to maintain the authority of an administrative body like the Interstate Commerce Commission is to adhere to certain rules and standards. This is clearly indicated in the repeated decisions of the Supreme Court. In the discharge of its duties and in determining the facts, it is in the exercise of quasi-judicial functions. It seems it was the intention of Congress that this commission should act upon the evidence and make its conclusions according to the rules and standards fixed by Congress. The respect which this commission has gained in the public mind has, we believe, been largely due to the fact that it is discharging its duties in an impartial and judicial manner. And in order that there may be success in the regulation of railroads, it is of course apparent that a uniform line or policy must be adhered to. There cannot be a different basis in each case. The strength of the common law arose from its adherence to fixed principles. It is not necessary that a hide-bound adherence to precedents be established. It is, however, proper, and we believe necessary that the commission act according to some standards and rules. Such was the evident intention of Congress. Such is the view of the Supreme Court. It gives dignity and power and authority to the commission. The effect of this opinion as we look at it, and as generally considered, not only by the respondents but also by the protestants and by the public, is to depart from the rules and standards which have heretofore been established. If a substantial reliance cannot be placed upon the maintenance of the standards by which the reasonableness of rates shall be determined, the deserved prestige of the commission will soon be lost. If this commission shall finally determine to abandon its prior standards, it ought to clearly so indicate, and to say that its opinions in the prior cases have been wrong. It ought not, however, to abandon its prior standards until it shall have had the advantage of the fullest discussion wherein those standards are directly involved. It ought to place its opinion in such clear and definite mold that the matter may be presented to the courts for determination whether it can act upon its own notions of propriety in determining the reasonableness of rates or whether it shall be governed by the rules and standards fixed by Congress.

The petition is signed by C. C. Wright, general solicitor, Chicago & North Western; T. J. Norton, general attorney, Atchison, Topeka & Santa Fe; W. F. Dickinson, general attorney, Chicago,



Rock Island & Pacific; C. S. Burg, interstate commerce counsel, Missouri, Kansas & Texas; A. P. Humburg, commerce attorney, Illinois Central; R. B. Scott, general attorney, Chicago, Burlington & Quincy, committee of attorneys for the carriers.

### TRANSCONTINENTAL ROADS PROPOSE FURTHER REDUCTIONS IN RATES TO MEET CANAL COMPETITION

Increasing competition of the water lines using the Panama Canal, which has impelled the transcontinental lines to make reductions on a large number of additional commodities to the Pacific coast, was described by witnesses for the railroads and for the shippers at a hearing before Examiner Thurtell, of the Interstate Commerce Commission in Chicago, which was begun on September 23, in support of the petition of the railroads for authority to establish reduced rates from eastern to Pacific coast terminal points. The commodities on which the carriers asked relief from the original fourth section order of the Interstate Commerce Commission in the intermountain rate cases, are included in a supplement to Schedule C, which included the commodities on which the commission allowed relief on account of the canal competition in its decision rendered last January. It is a list of 156 items, including several hundred commodities.

Paul P. Hastings, assistant general freight agent of the Atchison, Topeka & Santa Fe at San Francisco, testified on behalf of the transcontinental railways and introduced as an exhibit the list of commodities, together with the present rail rates from the eastern part of the United States, included in groups A to J of the transcontinental tariff, to Pacific coast terminals, a list of representative points of origin for each commodity, the water rates which have been quoted by the water lines through the Panama Canal during the past year, the tonnage of movement via the water lines, and a column of remarks giving explanations, as to each commodity, of the reasons why it was necessary to reduce the rates. Mr. Hastings explained that at the time of the application of the roads last fall for relief on the Schedule C commodities the canal had just been opened and the roads were not thoroughly posted as to the extent of the competition. Since that time they have found many commodities on which the movement from the eastern part of the United States has been almost entirely by water from points as far west as Chicago and the Mississippi river, including a number of commodities which have never been considered subject to water competition.

After the rendering of the commission's decision in January representatives of the transcontinental roads held a meeting in Chicago to consider the situation and remained in session from March 1 till about a month ago, considering the requests from shippers for changes in the rail rates to meet the new competition by the water lines. About 200 shippers had submitted questions or petitions regarding the rates necessary to meet water competition direct to the Interstate Commerce Commission, which had furnished copies to the roads, and between 200 and 300 shippers had appeared personally before the committee and explained why a reduction in their rates was necessary if they were to continue to do business on the Pacific coast in competition with the seaboard shippers.

Mr. Hastings said that the list of commodities on which the reductions were now proposed included only about one-tenth of those on which the shippers had asked reductions, and represented the results of the most thorough investigation on the part of the roads as to the necessity for reductions and the rates which would be necessary to apply. He said that the articles included in the supplements are affected by the same circumstances and the same kind of competition as the articles in Schedule C, as disclosed by the investigations of the railroad traffic men and information furnished to them by shippers and their agents regarding the rate, volume of tonnage, packing conditions, and the proportion of business which the railroads could expect to retain by adjustments in their rates. To some

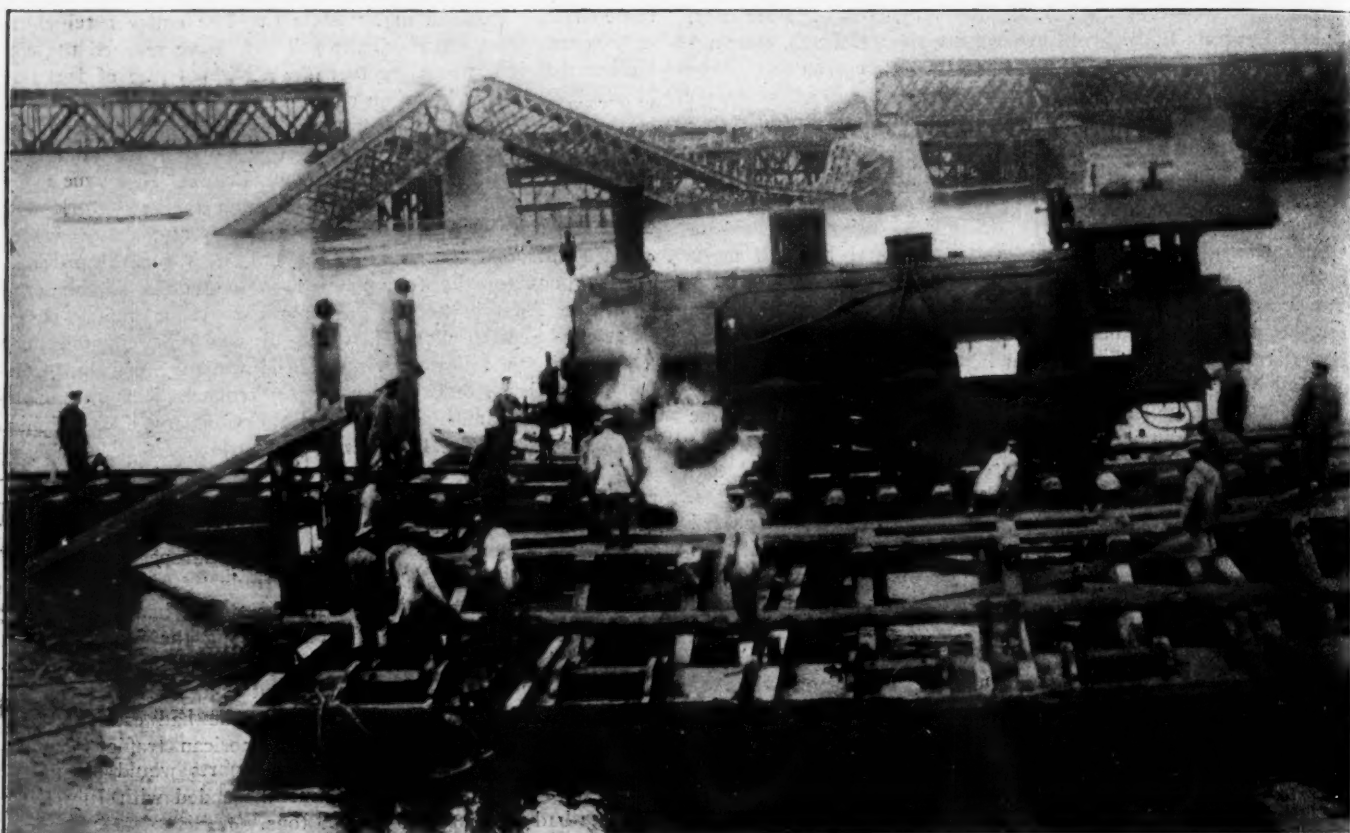
extent, he said, the petition also asked for a further relief on some articles included in Schedule C. The entire list includes only commodities on which the railroads have reached the conclusion that it is necessary to make a carload rate of less than \$1 per 100 lb., or a less than carload rate of \$1.50 or less.

In another exhibit Mr. Hastings gave a compilation of the local rates from interior points to New York on the same commodities, and the water rates from Boston, New York and Philadelphia added to make the through rates to the Pacific coast. He also gave a statement of the number of vessels operated through the canal westbound, with general merchandise cargoes for the four months' period ended September 5, from the Atlantic to the Pacific coast. If a vessel passed through the canal more than once it was only counted once. The list is as follows: American-Hawaiian Steamship Company, 21; Grace & Company, 2; Luckenbach Steamship Company, 10; Panama-Pacific Steamship Company, 2; Isthmian Steamship Company, 1; Crowell & Thurlow, 2; Tallac Steamship Company, 1; Boston and Virginia Transportation Company, 2; Western Steam & Navigation Company, 1. A number of lines, he said, had discontinued operation through the canal because of the greater profit, since the European war began, in chartering their vessels for ocean trade. A number of small lines which had engaged in the service at first had dropped out, but others had taken their place. During the year since the canal has been opened the water-borne tonnage from the Atlantic to the Pacific coast has been about double what it was the year before. At the previous hearing he had estimated that the tonnage through the canal of American traffic from the Atlantic seaboard to the Pacific coast ports would amount to about 1,000,000 tons. In the 11 months ended with July 1, the tonnage had amounted to 900,000 tons.

Mr. Hastings then took his first exhibit, and item by item explained for each commodity the justification for each of the rates proposed, and the reasons why it was necessary to make reductions to keep the middle western shippers in business. He said the information as to the water rates had been obtained from bills of lading and freight bills and had been furnished to the railroads by shippers, as examples of the rates quoted to them by the steamship lines, although the water rates had fluctuated greatly.

Mr. Hastings was followed by a number of shippers from various points in the middle west, who explained how they were affected in their competition with eastern shippers for the Pacific coast business. For example, a shipper of buckwheat flour at Janesville, Wis., testified that he had formerly been able to ship flour to the Pacific coast on even terms with the New York shipper, because he had a milling-in-transit rate of 90 cents, which allowed him to take buckwheat from New York and mill it and lay it down on the Pacific coast at the same rate paid by the New York shipper direct. With the opening of the canal the miller in interior New York was able to ship to the Pacific coast for 40 cents; 10 cents for the rail haul to New York and 30 cents for the water haul; a reduction of 50 cents under the all-rail rate. He said that if the railroads could make the proposed rate of 75 cents he could retain a portion of his business on the Pacific coast, but that a differential of 10 cents in favor of the water rate would influence the movement.

THE SAO PAULO RAILWAY OF BRAZIL.—The Sao Paulo Railway, 134 miles in length, produces more revenue per mile than any other railway in the Western Hemisphere. The line extends from Santos, via Sao Paulo, to Jundiahy, with a branch to Bragantina. The railway enjoys a monopoly of the traffic between Sao Paulo and Santos, and every year carries over one-half of the world's supply of coffee. Dividends of 14 per cent and upwards are paid annually. The railway is one of the best maintained properties in South America. At Sao Paulo a magnificent passenger station has been erected, while excellent terminals are owned at Santos.—*The South American*.



*Photo by Paul Thompson*

**Ferrying a German Locomotive Across the Vistula from Warsaw to Praga Before a New Bridge Had Been Rebuilt to Replace the Old One Blown Up by the Russians**



*Photo by Paul Thompson*

**The Germans Have Made Many Polish Women Work on the Roads and Railways of Their Conquered Territory**



# International Engineering Congress at San Francisco

## An Abstract of the Papers and Discussions Relative to Railroads at the Meeting Held September 20-25

The International Engineering Congress, organized and conducted under the auspices of the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineers, the American Institute of Electrical Engineers, and the Society of Naval Architects and Marine Engineers was held in the new Auditorium in the civic center of San Francisco, Cal., September 20-25. Two general sessions were held, on Monday morning and one Saturday morning, and in addition 52 section sessions were held for the presentation and discussion of papers on 11 general subjects. About 230 papers had been prepared in advance of the meeting by authors representing 18 countries. The attendance at the Congress totaled 830.

The general session on Monday was opened by William F. Durand, of Leland Stanford University, chairman of the Congress, who introduced Governor George W. Goethals, of the Canal Zone, honorary president of the Congress. After addresses of welcome by the mayor of San Francisco and the president of the Panama-Pacific Exposition, General Goethals addressed the meeting on the central theme of the Congress, the construction of the Panama canal. He touched only on the general features which were not covered by the technical papers presented later before the Panama canal section, paying tribute to many engineers connected with the work more or less directly, without whose efforts the success of the project would not have been so striking. Among the men mentioned were George M. Totten, in charge of the early construction work on the Panama Railroad; the early French engineers, who failed largely on account of mal-administration; Colonel Gorgas and others who practically exterminated yellow fever; John F. Wallace and John F. Stevens, the preceding chief engineers, and W. G. Bierd and Ralph Budd, who assisted materially in the reconstruction, operation and maintenance of the Panama Railroad.

Railway engineering occupied five sessions and abstracts of the papers presented are given herewith. A paper on "The Mechanical Problem of Electric Locomotives," presented before the third session on electrical engineering, and one on the "Commercial and Trade Aspects of the Panama Canal," presented at the session relating to the canal, have also been abstracted because of their interest to railway men.

### ITALIAN RAILWAYS

By PROF. LUIGI LUIGGI

Former Member of the Italian State Railway Board, Rome, Italy

The railways of Italy can be divided into "principal lines," owned and operated by the state, about 9,500 miles; and "secondary lines," owned and operated by many private companies, about 3,500 miles. The latter act as feeders and reach places in the mountains where an ordinary line could not run at a profit. Italy being generally hilly, and in some parts mountainous, railways are costly to construct, and operation is expensive owing to heavy gradients (up to 1 in 40 and in a few cases even 1 in 28) and to the fact that all the coal is imported. The working expenses in 1913 on the state lines were \$11,200 per mile.

On the other hand, the revenue is rather low, as in Italy there are no great mines or forests, and the goods traffic consists principally of agricultural products, which, in general, cannot afford a high tariff. The passenger rates also are very moderate. In 1913-14 the revenue of the state railways was \$13,750 per mile, which makes the operating ratio 81.5.

Tariffs are rather low—the law requires that for the first-class tickets the rate shall not exceed two cents per kilometer:

for second-class, 1½ cents; and for third-class, one cent. On a few lines there is a fourth-class, at ¾ cent per kilometer. These rather trying conditions are aggravated by a law which requires that on all lines three trains, at least, must be run daily. Thus, on several lines many trains run almost empty, especially in winter.

By this arrangement the financial situation of the state railways and private companies cannot be very flourishing. The result of the high operating ratio and high cost of the lines is that the traffic barely pays an interest of 1.6 per cent on the invested capital, and for some private lines there is a deficit, so that the state is obliged to pay annual subsidies of from \$1,000 to \$3,000 per mile of line. In such cases after 50 to 70 years the lines become state property.

Although from a financial point of view this policy may not seem satisfactory, the results from the standpoint of the national interests are important. Many regions of Italy were still very backward up to some years ago; agriculture was rudimentary and the population poor and ignorant. The construction of state railways was a national duty, to bring moral and material progress into those regions, regardless of high cost of the lines, which were difficult to build owing to mountains, ravines and malarial zones.

Thanks to this provident policy, the state railways, with their "differential tariffs," have cemented the political unity of Italy and given an enormous impetus to commerce. Agriculture is improving, especially in the south, and new industries are being started, especially in the north. The railways, with their low rates, are a great help in exchanging the products of the different provinces.

The most marked improvements have taken place since the advent of the State Railway Board, in 1905. Before that time the railways, although for the greater part belonging to the state, were worked by three private companies whose interests were different from those of the state. Each company worked its system with the object of getting the largest revenue with the smallest expenditure; therefore, tariffs were kept at the highest rate allowed by law, trains were slow and barely sufficient for the local needs, the rolling stock was old and not kept in good repair, and the personnel was under-paid and dissatisfied. Strikes were becoming alarmingly frequent. Parliament protested; and in 1905, when the contracts with the private companies expired, the state took over the control of all its own railways, and of a few other private lines necessary for the public interests.

This was a daring act and was especially risky from a financial point of view. Happily the government was lucky in securing the services of a most competent specialist in railway administration in the person of Comm. Riccardo Bianchi, formerly general manager of the Sicilian railways, who was given sufficient liberty of action to meet the many and serious difficulties which had to be overcome. The lines were put in good working order by renewing the permanent way, doubling many trunk lines and sidings, and improving the stations and shops. Then the rolling stock was renewed and augmented, and more and faster trains were run on the main lines. The tariffs were rearranged to facilitate the transportation of agricultural products for long distances, and a "differential tariff" for passengers was started, by which the rates per mile diminish with the increase of the journey. The personnel was also improved, so that strikes became more rare and easily settled, and the service was greatly benefited.

From a technical point of view, Italian railways present interest both for the large number of bridges, viaducts and

tunnels, which are a consequence of the hilly character of the country, and for the traction, either by electric or by steam locomotives. Large span bridges, steel girders or metallic arches are a necessity, and among these the most notable are the steel girders of the several bridges across the Po, and the 360-ft. steel arch bridge of Paderno. The most notable masonry bridge is that over the Adda, with a 236-ft. granite 3-hinged arch. There is also a handsome concrete bridge of three 100-ft. arches on the Bologna-Brindisi line at Fiume Rosso. Reinforced concrete bridges are in favor only for small spans, although on some secondary lines reinforced concrete arches of 100 ft. span are now under construction. It is in the matter of tunnels that Italian railways offer the greatest interest.

When the new state administration took over the lines, in 1905, it was confronted by a sudden and rapid increase of traffic, which continued steadily until it had actually doubled in 1912. The problem of traction was aggravated not only by the material difficulties of the profile of the line, but by the antiquated and dilapidated condition of the locomotives. This difficulty was overcome by adopting new types of steam locomotives on ordinary lines, and electric locomotives on steep inclines. Thus the problem of the great cost of coal was solved, for hydro-electric power in Italy is cheap.

Three types of steam locomotives were adopted; an 0-10-0 type for very heavy grades, a 4-6-2 (Pacific) type for fast passenger trains, and a 2-8-0 (Consolidation) type for mixed passenger and freight traffic. The first two are four-cylinder simple engines equipped with Schmidt superheaters, the second weighing close to 200,000 lb., and the third is a two-cylinder simple engine weighing 147,000 lb.

The distinctive feature of Italian electric locomotives is their operation by the three-phase system. It was adopted for the first time on lines where there are gradients up to 1 in 40 and long tunnels, where smoke is a serious drawback. Water power being cheap, it was possible to haul trains up these inclines at double the speed hitherto acquired, thus solving the problem of congestion of traffic, which was becoming pressing. On private lines, electric traction on the mono-phase and tri-phase systems has also been applied, but not on such a large scale as on the government lines.

The best of the electric locomotives used work on the tri-phase system, and were built by the Italian Westinghouse Company. There are 152 of these in service, and 40 more are in construction. These, coupled one at the head and another at the tail of a train weighing 400 tons, can go on an incline of 1 in 40 at the normal speed of 31 miles an hour. When coming down, the motors act as generators of current, and thus about 50 per cent of the energy is utilized.

It is difficult to say in general terms whether state management of railways is to be encouraged or not. As far as it concerns Italian railways—and considering how matters stood up to 1905—it would have been almost impossible to continue under private management. Thus state administration became automatically an absolute necessity. On the other hand, it must be said that in a country where parliament is all powerful state management is rather risky, especially from the financial point of view, and in regard to the discipline of the personnel. Happily, the government was very wise in appointing Comm. Riccardo Bianchi as president of the board of directors, a man of great experience and firmness, coupled with exquisite tact, who proved to be the right man in the right place.

#### THE STATUS OF INDIAN RAILWAYS

By VICTOR BAYLEY

Assistant Secretary, Railway Board, Simla, India

At the end of the year 1913-14,\* the mileage of Indian railways open to traffic and under construction or sanctioned was as follows:

	Open	Under construction or sanctioned
5 ft. 6 in. gage .....	17,641 miles	932 miles
3 ft. 3 in. (meter) gage .....	14,389 miles	821 miles
2 ft. 6 in. gage .....	2,174 miles	578 miles
2 ft. 0 in. gage .....	454 miles	112 miles
Total .....	34,656 miles	2,443 miles

#### STATE CONTROL

Indian railways are more or less under government control. The nature of the control varies from absolute ownership to mild supervision coupled with the power of purchase. The government also has certain control regarding maximum and minimum rates, matters affecting the safety of working, etc. The following list shows the ways in which railways are connected with the government:

Class 1. Railways Whose Accounts Pass Through Government Accounts—	
I. State Railways Worked by the State.....	7,264 miles
II. State Railways Worked by Companies.....	18,568 miles
Class 2. Railways Whose Accounts do not Pass Through Government Accounts—	
III. District Board's Lines.....	166 miles
IV. Branch Line Companies Assisted by Government...	1,420 miles
V. Companies' Lines Guaranteed by Native States....	721 miles
VI. Companies' Lines Assisted by Government.....	2,646 miles
VII. Native State Lines.....	3,643 miles
VIII. Miscellaneous .....	228 miles
Total .....	34,656 miles

The railways shown under Class 1 are the state railways of India, and their accounts form part of the finances of the government of India. These railways are the property of the government; they are officered by government officers; their revenues are part of the general revenues of the country, and all capital sums required are provided by the government. In the case of railways shown in Class 2 the relation to the government is not so close, but owing to the responsibility assumed by the government for payment of interest, etc., in many cases, it assumes a measure of control, which is, however, not so intimate as in the case of Class 1.

The state railways worked by companies are the property of the government but have been leased to private companies. The first railways in India were constructed and worked by companies, under favorable terms as to government guarantee of interest, which proved to be so advantageous to the companies and disadvantageous to the government that the earliest opportunity was taken to purchase them. Certain of these lines became state railways, and others became those now under consideration. The government has entered into contracts with the companies, the broad features of which are (1) that the company shall have a small working capital in the concern on which the government guarantees interest at rates from 2 to 3½ per cent; (2) that the company shall receive a share of the surplus profits earned by their efforts calculated on a fixed proportion agreed upon or in proportion to the capital contribution made by the company; (3) that the company shall keep the railway in good order; (4) that the government shall have power to terminate the contract after due notice, and repay the company's capital at par.

The interest of the government is to see that fresh capital put into the concern is well spent, that the line and rolling stock are kept in good order, and that a profit is earned by good management. The interest of the company is mainly in making the most of the railway as a dividend-earning investment during its period of tenure. The policy of the government is to conclude long term agreements with the companies and renew the agreements as they fall in, with possibly a revision of the terms if this is expedient. The companies' administration is loyally and efficiently carried out, and the result is a substantial addition to the revenues of the country, and also the declaration of substantial dividends for the companies' shareholders.

District boards have been established in certain localities as a measure toward giving the inhabitants a measure of control

\* The financial year runs from April 1 to March 31. Thus the year 1913-14 means the year April 1, 1913, to March 31, 1914.



over their own domestic politics. In a few cases they have shown praiseworthy ability and have accumulated surpluses which they have been permitted to invest in the construction of light feeder railways. In such cases the assistance rendered by the government is practically confined to giving the land required, free of cost, to the district board and in using its good offices in the preliminary negotiations. The government takes no share of the profits and only reserves the right to purchase the line in certain contingencies. As a rule, the railway is worked by the main line with which it connects for an agreed percentage of its gross earnings. This development of a form of state ownership (since a district board is a form of government) is interesting as an example of Indian enterprise.

Branch line companies assisted by the government are a modern development. One of their objects has been to provide an outlet for the savings of the people. Indians are shy of investing their savings in industrial enterprises, and require definite assurances of profit before they will come forward. The government, therefore, recently published an ordinance inviting proposals for the construction of branch lines to the existing systems from promoters, and engaged, after being satisfied as to the financial prospects of the proposed branch and the reliability of the promoters, to render assistance by giving free land and a guarantee of  $3\frac{1}{2}$  per cent on the capital invested; or a rebate out of the net earnings of the main line, with which the branch connects, derived from interchange traffic, sufficient to make up, together with the net earnings of the branch, a sum equal to 5 per cent on its capital. A combination of guarantee and rebate terms may be permitted. In return the government retains the right to share equally with the branch line company all profits above 5 per cent and to purchase the line after a term of years.

The success of this agency for financing feeder railways is assured. Apart from 21 branches, aggregating 1,420 miles, already in operation under these or similar terms, concessions have been granted to six more companies to operate an aggregate of 224 miles, and proposals are under examination involving the construction of 2,257 miles of railway at a capital outlay of \$40,000,000. It is interesting that short feeder lines on the 2 ft. 6 in. gage have so far proved most attractive to promoters.

Companies' lines guaranteed by native states are the result of a peculiarity of British administration whereby certain parts of India are under the rule of native chiefs. Certain progressive states have desired to shoulder the guarantees normally given by the government and to reap for themselves the benefits arising from railway construction within their borders. Such railways are practically independent of government control, except in so far as the government is responsible for the safety of the working and the good administration of the railway as forming a part of the administration of the native state.

Companies' lines assisted by the government are lines built by companies receiving miscellaneous forms of government assistance. They are liable to be bought up by the government as their agreements fall in. They are practically independent of government control, except in so far as the government is concerned in safe working and in eventual purchase.

Native state lines are under the rule of native chiefs. Some of these native states are prosperous and under an enlightened ruler surplus revenues may, by government sanction, be invested in railway construction. In this way a considerable mileage of native-state-owned railway has been built. Some of these railways are worked by the native state and others by companies. Others again are worked by the main system to which they are branches for a percentage of the gross earnings. The government is interested in the good management of the lines, and in some cases exercises control over maximum and minimum rates, but, on the whole, government control sits lightly.

#### FINANCIAL RESULTS

Taking first the railways mentioned in Class 1, i. e., the State

Railways of India, the financial results, in United States dollars, for the year 1913-14, are as follows:

Capital outlay (booked cost) .....	\$1,495,443,000
Gross revenue .....	188,196,000
Working expenses .....	100,374,000
Net revenue .....	87,822,000
Percentage of working expenses on gross revenue.....	53%
Percentage of net revenue on capital outlay.....	5.9%

If the state railways were a private business concern, the net revenue of 87.8 million dollars would be available for the declaration of a dividend, etc. It was actually applied as follows:

Interest charges on capital borrowed for direct application to works and also for purchase of railways.....	\$46,278,000
Annuities in purchase of railways.....	12,015,000
Payments in redemption of capital.....	4,833,000

Total charges on net revenue.....	\$64,126,000
Net profit to government from state railways.....	23,696,000

Although the accounts of the railways in Class 2 do not pass through government accounts, their results of working are available for addition to the above figures in order to view the results of working the entire body of Indian railways considered as a whole. The financial results for the year 1913-14 are as follows:

Capital outlay (booked cost) .....	\$1,650,300,000
Gross revenue .....	211,951,000
Working expenses .....	109,768,000
Net revenue .....	102,183,000
Percentage of working expenses on gross revenue.....	52%
Percentage of net revenue on capital outlay.....	6.2%

Comparison of these figures with those for the state railways alone, given above, show the preponderating importance of the state railways; in fact, the state railway administration controls railways on which the capital outlay is 90 per cent of that of all Indian railways and whose gross revenues are 89 per cent of those of all Indian railways.

#### STATE RAILWAY ADMINISTRATION

The state railways are controlled by the railway board, consisting of a president and two members, and are divided into eleven separate concerns, of which three are worked by the state and eight by companies. Each of these railways is administered by an agent (general manager), who is responsible to the railway board for the efficient working of his railway. A system of delegation of powers places the agents in an independent position for all practical purposes. Broadly speaking, the object aimed at is that the agents shall settle for themselves all details of management and the railway board shall possess control over major questions of policy and finance.

The railway board with its staff forms a distinct railway department of the government of India, the portfolio of which is held by the member of council who has charge of the Commerce and Industry Department. The government of India again is responsible to the British government in the person of the secretary of state for India. Here again a system of delegation of authority from the secretary of state to the government of India and from the government of India to the railway board, has resulted in a workable scheme wherein only questions of the first importance need to be referred to higher authority. A slight complication is introduced by the fact that all the eight companies which are engaged in working state property are constituted in England, and the boards of directors of these companies naturally exercise authority over the agents of their railways. Smoothness of working is assisted by the fact that an official of the India office is appointed to sit on the board of directors of the companies, and that by a delegation of their powers the directors are usually content to leave the management of their property in India to the agent, subject to their retaining control of important matters.

The state already owns 90 per cent of the railway property in India, and if it chooses to exercise the power it possesses under the purchase clauses of its agreements with the remaining 10 per cent can become the owner of all railways in India,

in time. Whether such powers will be exerted when the time comes, as each agreement falls in, will probably be determined by the circumstances of each case on its own merits. There is no reason to regret the policy of acquirement in the past, as the state railways are returning handsome profits to the government. The strong position they occupy will be augmented as the payment of terminable annuities for the purchase of railways ceases. The capital value of the state railways is believed to be considerably in excess of the book value, owing to the policy of applying certain sums from revenue to works involving a degree of betterment.

### THE STATUS OF CHINESE RAILWAYS

By CHARLES DAVIS JAMESON

Supervising Engineer and Architect to the Imperial Chinese Board of Foreign Affairs, Peking, China.

The first definite plan for a railway in China was a petition by the foreign merchants in Shanghai, mostly English and Americans, dated July 20, 1863, which was not granted. In 1864, Sir McDonald Stephenson, an eminent British engineer, arrived in China to impress the advantages of railways on China, but his scheme was pigeonholed. The next scheme was the Woosung Railway, from Shanghai on the Huangpu river to Woosung at its mouth, a distance of 12 miles. On June 30, 1876, the road was opened for traffic for a distance of five miles, but the Chinese authorities wanted no foreign railway. Eventually the Chinese government bought the railway and demolished it. During 1887 to 1893 there was constructed on the Island of Formosa, then a part of China, some 60 miles of metre-gage railway, by the Chinese. The construction was of inferior quality, and the work was stopped by orders from Peking; the railway gradually went to pieces until the taking over of Formosa by the Japanese in 1896. About 1870 there was organized the China Merchant Steam Navigation Company, with a fleet of coast steamers, Chinese capital and under Chinese management. Much coal was needed. The Kaiping coal mines at Tongshan were 29 miles from the nearest point of delivery on the sea, and railways were proposed, but the imperial sanction was revoked, and a canal decided upon. This canal could not reach the mines by seven miles, and a tramway with mule power was constructed. The tramway and canal were finished in 1881.

Thus was inaugurated China's railway system. In 1887 the railway was completed from Tangshan, via Tongku, to Tientsin; in 1894, from Tangshan to Shanhai Quan, and in 1897, from Tientsin to Peking. The government of China had, by 1898, realized two points regarding the introduction of railways: First, the necessity of railways, and, second, the impossibility of procuring Chinese capital for the building of railways. The Chinese would not subscribe because of a lack of confidence in the government. The result was the railway concessions.

In Peking, 1898 was the year of concession hunters. The whole world was represented. Some represented bona fide syndicates. Many represented hopes and were hunting for both concession and syndicate. Then was seen the difference between the methods of the continental and the Anglo-Saxon. The English and American would not sign until every detail of the agreement was satisfactory. The Belgian or French would sign almost any agreement that gave them the absolute right to the work and then fight out the details later. The continentals then, and ever since, have had the cream of the railway concessions, and they have done the work they agreed to do. The British also have done most excellent work in all the railways they have built. An American syndicate was granted a concession for the Hankow-Canton Railway, did but little work, and later was bought out by the Chinese government, and the line is now being built by British money and British engineers.

All the railways of China, with the exception of a few short lines usually for some special purpose, are government owned and government run. They are under the ministry of communication located in Peking. On all the railways having a

foreign indebtedness, certain positions are filled by foreigners with necessary foreign assistants. The nationality of these foreign employees, in every case, follows the nationality of the syndicate furnishing the capital, except in subordinate positions. From this one can see the small opportunities there are in China for Americans in railway employment. American participation in the construction of Chinese railways has been, to say the least, unfortunate, and, of course, the non-participation of Americans in this work has militated strongly against the purchase of American rolling stock, locomotives and railway material. There are now some 6,200 miles in operation, and between 8,000 and 9,000 miles under construction, location, or for which definite agreements between the Chinese government and foreign syndicates have been signed, for either financing and constructing, or for merely financing. Less than 300 miles of this amount comes to America.

The freight rates in China are high—what the traffic will bear and often a little more. In North China the coal rate is \$2.05 for 300 miles. On the Peking-Mukden Railway the rates are: First class per ton, 5 cents per mile; second class per ton, 3½ cents per mile; third class per ton, 1¾ cents per mile; dangerous, 5 to 7¾ cents per picul (133 lb.).

### ELECTRIC MOTIVE POWER IN THE OPERATION OF RAILROADS

By E. H. MCHENRY

The first serious consideration of the application of electric traction to heavy railroad service was undertaken by Henry Villard, who appointed a commission early in 1892, of which the writer was a member, to investigate and report on the feasibility of electrically equipping the main line of the Northern Pacific. No substantial progress was made apart from the completion of a schedule of service requirements and general specifications for an electric locomotive substantially as constructed in the course of the following year by the North American Company.

The subsequent evolution at first separated into two distinct lines of progress; in one of which the primitive type of motor cars hauling one or more trailers was simply substituted for the steam locomotive previously used, from which the powerful high-speed trains of to-day have grown.

The necessity for some form of motive power better adapted to conditions of tunnel operation forced the almost simultaneous development of an electric locomotive of sufficient power to afford a satisfactory and efficient substitute for the steam engine then in use. The first commercially practical engines of this kind were operated by the Baltimore & Ohio through its Baltimore tunnel in 1905. The present list of tunnels so operated is a long one.

Next in the order of time and importance, electric traction was adopted in large terminals, to which it is peculiarly well adapted. By an act of the New York State Legislature the New York Central and the New Haven were required to electrify within the City of New York, on or before July 1, 1908. The magnitude, complexity and high traffic density involved in this terminal made necessary the solution of many new and formidable problems on a much higher plane of operation than had been previously attempted, and no less remarkable is the Pennsylvania's great passenger terminal in New York City. Other railroad terminals have been electrified in this country and abroad, some of which antedate the two most prominent examples already cited.

Electric switching was initiated very early and has now reached an advanced stage, best represented in the Mott Haven yard of the New York Central & Hudson River, the Sunnyside yard of the Pennsylvania and the Oak Point and Harlem river yards of the New York, New Haven & Hartford—all within the city limits of New York.

The Long Island was the first steam road to equip its lines for passenger travel on an extensive scale (1905), and the Spokane & Inland Empire was the first to attempt long distance



heavy freight traffic in 1906. Later and more advanced examples of railroad electrification of this class in the United States are afforded by the Norfolk & Western, Baltimore & Ohio; Chicago, Milwaukee & Puget Sound and the New York, Westchester & Boston.

The inability of the electric locomotive to flexibly utilize its available horsepower by inversely varying speed and tractive effort is a severe handicap under some conditions. Another factor which undoubtedly exercises a deterrent effect upon the more rapid adoption of electric traction is the number and diversity of the types now under trial, together with the yet unsettled opinions of the specialists in this field. Electric traction also labors under disabilities of restricted radius of operation, which limits commercial efficiency. This is a temporary disadvantage, however, and grows less as the zone limits are enlarged. Also the greater freedom and flexibility of operation within the zone limits applies in compensation. Electric traction leads to the necessity for an intricate and highly developed system of inter-related and inter-dependent power stations, line equipment and locomotives requiring more highly specialized and better paid labor for its proper maintenance and operation.

Induction may seriously impair telegraph and telephone service in adjacent circuits, and is more particularly incident to single-phase operation. Electrolysis may cause great damage to pipe systems, underground cables and all metal structure, but its effects are practically confined to direct current operation. Among the minor difficulties should be noted those arising in the transition stage in changing from steam to electric power, more particularly those incident to train lighting and heating; mixed steam and electric operation; engine transfers; track signals; restricted interchangeability of engines and cars and other difficulties of adaptation. These difficulties are greatest in the earlier stages of the transition, but rapidly diminish in both absolute and relative importance as the zone of electric operation is extended.

A better utilization of the possibilities of the electric locomotive is probable, which in one important particular compares very unfavorably with the steam engine of the same horsepower capacity, as it cannot effectively utilize its rated capacity throughout the same wide range of variable speed and tractive effort, which has the effect of greatly limiting its field of usefulness.

A further and promising opportunity is presented for reducing and limiting the present great expenditures incurred for maintenance of equipment and maintenance of way and structures. There is also a pronounced tendency in electric engine design to eliminate all reciprocating parts, including connecting rods, pins, jack shafts and counterweights in order to reduce wheel loads, machinery friction and maintenance charges.

It is also probable that some form of multiple unit control will be developed for the operation of freight trains which will relieve and distribute the present excessive strains on draft rigging, track and bridges, which will require the equipment of freight trains with a system of control circuits. The necessity for such equipment seems close at hand, in connection with similar requirements for electro-pneumatic brake control and the growing need for better means of communication throughout the length of modern freight trains.

A comprehensive review of the results already obtained, and of the attractive possibilities indicated by the experience of later years, leads to the conclusion that the field in which electric traction may be profitably applied is much larger than generally understood, and that there are many existing opportunities for capital investments upon a large scale which will earn from 10 to 20 per cent with reasonable certainty. While the art is not yet fully developed in some applications, in many others all present practical requirements may be met with added advantages of great value and profit, and there is consequently little reason to doubt a continued development and further expansion in the field of electric traction as soon as the financial and legislative conditions permit.

## ELECTRIC MOTIVE POWER IN THE OPERATION OF RAILROADS

BY WILLIAM HOOD

Chief Engineer, Southern Pacific

In considering the question of electric motive power versus steam locomotives, the probability of the electric motive power being proper for adoption is evidently greater on a new than on an existing railroad. This question is especially important when the existing railroad is an extensive suburban system, with steam locomotives and cars of special adaptation to the service and not suitable for general use on a steam-operated main line, and which suburban system is giving satisfactory returns on the investment. In such a case the change to electrical operation may transform a satisfactory remunerative property into a heavily losing investment for a disastrously long period.

The probabilities of the propriety of electrical operation are greatest on a new main line railroad, next greatest on an existing main line railroad when the equipment, other than motive power equipment, will not be changed, next greatest on one or more operating divisions of an existing main line railroad, when the equipment, other than motive power equipment, will not be changed, and least on a railroad when electrification involves scrapping or nearly corresponding salvage value of existing equipment.

The question of whether or not to adopt electric motive power on a portion, for instance on an operating division, of a main line elsewhere operated by steam locomotives is especially likely to be taken under advisement in reference to a mountain operating division having a steep grade system of considerable length, the electric operation at first glance appearing particularly attractive on such a piece of railroad.

Evidently such a railroad if already built with a double track is more conveniently operated either with electric locomotives or with steam locomotives, than if built with only a single main line track. The opinion that is sometimes entertained, however, that in cases where a single-track road is already overburdened with traffic as handled by steam locomotives, the substitution of electric locomotives will materially postpone the expenditure necessary for double tracking the road is not always correct, excepting with the condition that an unusual and, perhaps properly termed, unreasonable and impracticable amount of electric power is available at a cost that can be properly contemplated.

The reason for this condition is that on a single-track mountain railroad operating division with a steep grade system and having a considerable number of daily passenger trains throughout the year, the time of passage of these trains over the mountain division cannot be materially modified, owing to necessary business adjustment of times of departure from and arrival at important terminals. And with a considerable freight traffic at all times, and perhaps several times the average freight traffic at certain seasons of the year it is necessary to move a number of freight trains of maximum practicable size one after the other, and as near as practicable to each other, up the steep grade, at such periods of the twenty-four-hour day as will least interfere with the passenger train movements.

This is accomplished without difficulty with steam locomotives, but with electric operation, not only must the adequate number of electric locomotives be on hand for meeting these traffic conditions, but the amount of electric power available must correspond to the special traffic requirements.

In general, a transportation company will find it impolitic to attempt to equalize power production and fluctuating consumption on so large a scale by entering the market and selling power to suitable consumers in competition with power producing companies regularly in the business of supplying the market. This results in the cost of power to a railroad company for operating a mountain division being, in general, equal to the entire cost of operating the power house or houses and their related plants plus the entire fixed charges, without very material

variation in this cost on account of variations in amount of traffic as between seasons of the year or as between the several years. The cost of power under these conditions then has no direct relation to the actual power expenditure for conducting transportation, and in a way is analogous to the fixed charges pertaining to power-plant installation, as well as to the fixed charges pertaining to the cost of the railroad itself, which fixed charges are constant, regardless of traffic fluctuations.

In general, the cost of double tracking a mountain division will be so great that it should not be done until absolutely necessary, especially in view of possible failure of traffic to increase or even remain constant, on account, for instance, of the construction of competitive lines, entered into judiciously or otherwise. Evidently on light grade railroads the question of amount of installation of power plant versus fluctuations of traffic is less serious.

The reduction in the necessary production of electric energy by the returning to the line of energy produced by the control of descending trains on a mountain division, electrically operated, might be worth the expense of installation of the necessary appliances as effecting some fuel saving in a steam-power electric-generating station; but when the electric energy is developed in a water-power station, the power saving would be of doubtful value, and in particular because, as heretofore outlined, the cost of power so produced is not per kilowatt hour or any usual function, but is essentially so much per year, regardless of any ordinary fluctuations of power requirements.

The increasing cost of fuel for steam locomotives or for steam electric-generating plant tends to hasten the time when railroads will be operated by electric power generated by hydraulic plants, particularly on mountain grades. Presumably much more would have been accomplished in this direction if the national laws and regulations had been so modified as to give to railroad companies the necessary confidence to enable them to make the very large investment required.

### THE MECHANICAL PROBLEM OF THE ELECTRIC LOCOMOTIVE

BY G. M. EATON

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The stresses due to the static and dynamic interactions of the various elements of the transmission systems of crank-and-rod coupled electric locomotives have been the subject of an active discussion during recent years, and elaborate formulae for the approximation of existing stresses have been developed. It is the purpose of this paper to approach the static problem from a somewhat different angle than has been previously employed.

On a steam locomotive the pistons, piston rods, main rods, and main driving axle constitute a statically determinate system, the indicator diagram and the masses of the various elements supplying all the data necessary for a complete analysis of static and dynamic phenomena. In contrast with this determinate mechanism, practically all electric locomotive crank-and-rod drives are statically indeterminate, to the extent that no accurate general formulae can be derived that will determine the distribution of tractive effort between the near and far rods at all points of revolution.

If the material of the shafts, crank pins, bearings, framing, etc., were absolutely rigid and appreciable play existed in the various pin and journal bearings, a sudden interchange of load between the near and far sides would occur at points approximately 45 deg. from the plane of shaft centers. For the sake of uniformity, anti-clockwise rotation, with the near crank 90 deg. ahead of the far crank, will be adopted in all cases.

It is evident that the near rod, when on the dead center, can carry no load, since it hangs loosely on its pins. As rotation occurs the near rod will continue in its relaxed position (if the material is rigid) until it approaches the 45-deg. position. There will then be a sudden transfer of load to the near rod. It will

be assumed that when the cranks are on the 45-deg. points, the tractive effort is equally divided between the two rods. It is evident that when one rod and its pin are in the plane of the shaft centers, the entire tractive effort is carried by the rod whose cranks are at 90 deg. from the plane of centers. The stress imposed on the rod in this 90-deg. position will be termed a 100 per cent stress. Further, as the far rod approaches the plane of the shaft centers, the stress during the period in which the rod transmits the entire tractive effort will increase to a greater value than the 100 per cent stress, following the law  $P = \frac{\sin A}{100\%}$

where  $P$  is the rod stress and  $A$  is the angle between the crank and the line of shaft centers.

**Maximum Stress Conditions.**—Abandoning the inaccurate assumption of rigid material, the point at which the stress on the far rod is a maximum can be approximately determined by a cut-and-dry method that will be described later. It is first necessary to analyze briefly the various conditions under which the maximum stress may occur.

These conditions will fall under the following general heads:

Regular service—

- Slipping wheels at maximum adhesion.
- Running at maximum speed (rod whipping).
- Running at critical speed (resonance).
- Brake application.

Emergencies—

- Flashing or bucking of motors.
- Errors of assembly.
- Collision, derailment, etc.

**Method for Determining Maximum Stress.**—The approximate method for determining the maximum stress, after the maximum condition is determined, is as follows:

Assume all dimensions of a specific transmission, including all pin and journal clearances, and including the framing in which the shafts are mounted. Examine the specific transmission with a view to determining which of the following deflections, etc., are of magnitude worthy of consideration:

1. Torsion of the driving shaft.
2. Bending of the driving shaft.
3. Elimination of clearance in the driving shaft bearings.
- \*4. Compression of the driving-shaft bearing brasses.
- \*5. Torsion of the driving crank.
- \*6. Bending of the driving crank.
7. Bending of the driving-crank pin.
8. Elimination of clearance in the driving-pin bearing.
- \*9. Compression of the driving-pin bushing.
10. Compression or elongation of the connecting rod.
- \*11. Compression of the driven-pin bushing.
12. Elimination of clearance in the driven-pin bearing.
13. Bending of the driven-crank pin.
- \*14. Bending of the driven crank.
- \*15. Torsion of the driven crank.
- \*16. Compression of the driven-shaft bearing brasses.
17. Elimination of clearance in the driven-shaft bearing.
18. Bending of the driven shaft.
19. Torsion of the driven shaft.
20. Bending of the locomotive framing.
21. Torsion of the locomotive framing.

In electric locomotive practice, in the United States, the parts usually approximate rigidity closely enough to make it safe to neglect the starred items, 4, 5, 6, 9, 11, 14, 15 and 16. In studying any new design, however, all twenty-one items should be roughly evaluated in a preliminary survey, before eliminating any from further consideration.

The position where the far rod will be subjected to maximum static stress will, evidently, be between the position  $A = 90$  deg. and  $A = 45$  deg. Select a point about midway between these two positions and assume arbitrarily a definite division of effort between the near and far rods. Start with the near driving-crank pin as origin and locate by rectilinear co-ordinates the following points of the transmission in the order named, making allowance for clearing and for essential deflections: Near driving-shaft bearing; far driving-shaft bearing; far driving-crank pin; far driven-crank pin; far driven-shaft bearing; near driven-shaft bearing, and near drive-crank pin.



Calculate the distance between the near driving-crank pin and the near driven-crank pin. If this distance checks with the length of the near rod, under the assumed stress and clearance conditions, then the assumed distribution between the near and far rods is approximately correct. If the rod length fails to check, the distribution assumption must be altered and the calculations repeated. Having determined the distribution for one point, analyze adjacent points in the same manner. The analysis of three or four points will determine the maximum point with sufficient accuracy for all practical purposes. The very laborious and approximate method outlined above is offered with a full realization of the errors involved. It is, however, the most accurate method the writer has been able to devise and has been successful in actual use.

With the material, proportions, and clearances customary in electric locomotive practice in the United States, and at 40 per cent rail adhesion, the above method shows a maximum static stress on the rods of about 15 per cent in excess of that imposed at the 90 deg. position. This stress will be referred to as the 115 per cent stress. This value is approximately correct under the assumed conditions, both for the transmission from the motor shaft to the jack-shaft, and from the jack-shaft to the axle. This stress occurs practically at the point where the other point comes into action. It is evident that the maximum stress will vary in the following manner:

First, the maximum stress will vary as an inverse function of flexibility. This constitutes an argument in favor of heat-treated and alloy steels, since high unit stresses, and therefore greater deflections, are permissible; second, the maximum stress will vary as an inverse function of the load; third, the maximum stress will vary as a direct function of the speed (with motors of series characteristics); fourth, the maximum stress will vary as a direct function of pin and journal clearances.

In none of the above features are the arguments necessarily conclusive. They must be balanced against the other existing arguments for the purpose of selecting that compromise offering the greatest overall advantage. Having once arrived at the figure 115 per cent for maximum static stress under a definite set of conditions, it is sufficiently accurate to use this figure for all designs consistently worked out in accordance with the same general practice. For any radical departure of practice, a specific maximum stress should be derived.

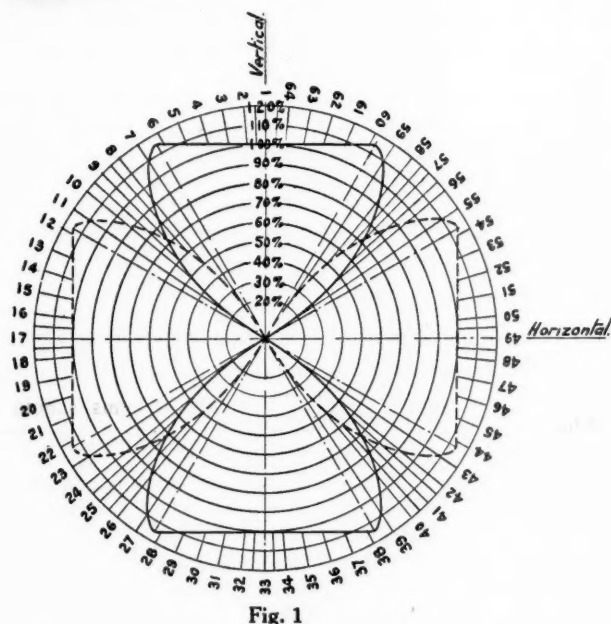


Fig. 1

**Polar Diagrams.**—It now becomes possible to construct an approximate polar diagram, Fig. 1, which will be characteristic for all cases of driving and driven shafts, crank-and-rod connected, whose maximum stress is 115 per cent. Points 1 to 6, inclusive, are correct, and points 7, 8, 10 and 11 are approximations, the

curve being so constructed that it is a fair curve; and, at the same time, the sum of the turning movements on the near and far cranks is always equal to the constant turning movement of the motor.

With motors of series characteristics, as the speed increases, the tractive effort decreases. The deflections, therefore, decrease and the clearances assume a greater importance as the speed increases. There will be some deflections, and the maximum rod stress will probably never reach the limiting value of  $\frac{100\%}{\sin 45^\circ} = 141$  per cent. This 141 per cent stress might be reached, or even exceeded, if the interchange of effort between the near and far rods were accompanied by a shock. However, the rod is, at high speed, always held in intimate contact with its pin by centrifugal force.

Without going through the elaborate deflection calculation, the maximum condition that may be expected is closely approximated by Fig. 2, where the law  $P = \frac{100\%}{\sin A}$  is assumed to apply, except over a very acute angle of interchange of effort between the near

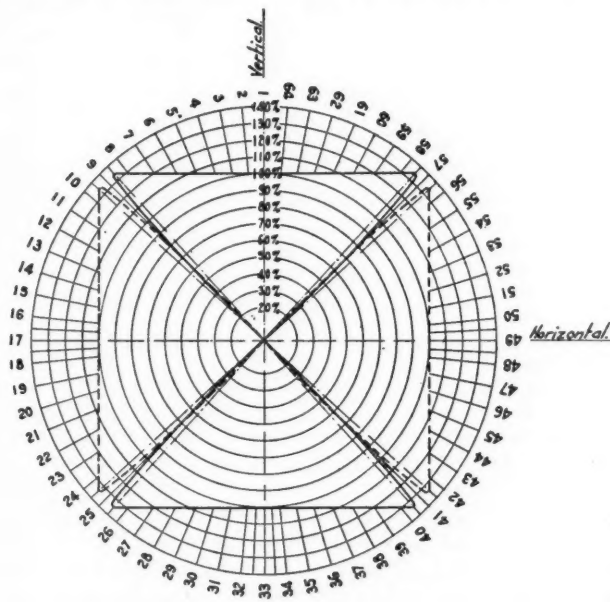


Fig. 2

and far rods. In case of a motor flash, and attendant high pressure at high speed, considerable deflection will occur because of continual intimate contact of the rods and pins. The action of the pin will be a rolling from a driving to a retarding position in the rod bushing, rather than a jumping across the bearing clearance. Figs 1 and 2 form the basis from which pressure diagrams may be plotted for the various shafts, bearings, etc., in the transmission of various types of crank-and-rod coupled electric locomotives at a maximum tractive effort, and also at maximum speed where the design is such that the maximum stresses are 115 per cent and 135 per cent respectively.

[The remainder of the paper contained a discussion of polar diagrams of the pressures on the crank pin, rod bushing, jack shaft and its bearing for maximum speed and maximum adhesion conditions for three types of crank-driven electric locomotives.—EDITOR.]

#### COMMERCIAL AND TRADE ASPECTS OF THE PANAMA CANAL

BY EMORY R. JOHNSON

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The Panama Canal was constructed primarily to shorten the length and time of ocean voyages. The people of the eastern and southern parts of the United States are interested in the Panama Canal, first, because it affords a shorter highway to the west coast of the United States; secondly, because it reduces the distance to the west coast of South America; and

thirdly, because of the opening of a shorter route to Australasia and the Orient. The people of the western section of the United States are benefited by the Panama Canal because it gives them readier access to the markets of Europe and the eastern part of the United States, while the manufacturers and traders of Europe are benefited by securing a shorter and more direct route to the west coast of the three Americas.

The best test of the value of the Panama Canal will be the use made of it by the commerce of the world, and particularly by the shipping engaged in American commerce. The canal was opened for traffic August 15, 1914, before it was fully completed. Since it was opened for traffic, slides in the Gaillard (Culebra) Cut have, on a few occasions, interrupted the use of the canal for periods of one to five days, and these interruptions to traffic have doubtless somewhat delayed the establishment of regular services through the canal, and have possibly made the increase in the traffic of the waterway somewhat slower than the gain otherwise would have been. The conflict in Europe started shortly before the canal was opened, and all advance estimates as to the use that would have been made of the canal have been thrown out of line by the war which has temporarily stopped the commerce of some nations and has seriously interfered with the international trade of most countries. It is probable that the European war has cut in half the tonnage of the Panama Canal traffic.

The use made of the Panama Canal by American manufacturers and traders will depend upon the extent to which the steamship lines operating through the canal are able to compete with the rail lines connecting the eastern and western parts of the United States for traffic originating or terminating at interior points. It is too early to reason with any degree of finality concerning the ability of the coastwise carriers to secure traffic between the Mississippi Valley and the Rocky Mountain states. There is no doubt, however, that the rail and water lines will actively compete for large west-coast shipments to and from all points between the Atlantic seaboard and places as far west as St. Paul and St. Louis. For the most part, the traffic of the eastern part of the United States will move to the west-coast states by rail, but there will be active and continuous competition for a portion of this traffic.

There has been apprehension on the part of manufacturers in the central section of the United States and also on the part of the railroad companies whose lines connect the Mississippi Valley with the Pacific Coast lest the Panama Canal may cause the rates coastwise between the two seaboard to be so much lower than the rates all-rail or by rail-and-ocean between the section extending from the Allegheny Mountains to the Missouri River and the section along and tributary to the west coast as to make it impossible for some producers at interior points to compete successfully with producers at or near the seaboard, and in consequence to bring about the shifting of some industries from the Mississippi Valley to the Atlantic seaboard states and to cause new industries to be located near the seaboard rather than in the inland cities.

Producers located at inland points will, without doubt, have to pay higher rates on goods shipped in either direction between the eastern and western sections of the United States, and producers located at or near the Atlantic and Gulf seaboard will enjoy lower rates than can be secured by producers at interior points, not only on traffic between the two seaboard of the United States, but on shipments to and from western South America, Australasia and the Orient. The influence of the canal on the location of industries may, however, be easily exaggerated. The United States as a whole is so large, its industries are so varied and so widely distributed through the country, and the interstate commerce by rail is so many times greater than the entire traffic through the canal will ever be that the commerce by way of the canal between the two seaboard of the United States and between either of those seaboard and foreign countries can be only one of the many forces that will influence the location of industries. The greatest

factor determining the location of industries in the United States is the domestic market. A second, and a most influential, factor is the source of raw materials. While freight rates are a third influence that determines where plants shall be constructed and industries be conducted, freight rates are not the strongest influence determining the distribution of industries. It often happens that the ability to ship by rail to all points of the country with despatch and with a minimum handling of goods will cause an industry to locate at an inland point, although by locating at or near a seaport lower freight rates could be obtained.

It was the states on the Pacific Coast that had the greatest interest in the construction of the canal. Manufacturing being in an early stage of development, those states were, before the opening of the canal, obliged to secure manufactured goods mostly by rail, and to pay high freight rates for the long and expensive haul from the eastern and central sections of the country over the Rocky Mountains barrier. Likewise, the people of the west coast section had to pay high freight rates on their grain, lumber, fruit, fish and other staple products. The Panama Canal has enabled the west coast of the United States to reach the markets of both sides of the Atlantic readily and inexpensively, and has prepared the way for the expansion of west-coast industries at an even more rapid rate than has thus far characterized their development.

Shortly before the canal route became available, the Supreme Court upheld the decisions of the Interstate Commerce Commission in the Intermountain Rate cases and the commission issued an order establishing the percentage adjustment between the through rates to the west coast and the rates to intermediate intermountain points. Had that system of percentage adjustments remained unchanged, the effect of the canal upon through rates by rail between the two seaboard would have been to have determined automatically the rates to intermediate intermountain points. The Pacific railroads, supported by certain business interests in the Middle West, were, however, desirous of securing authority to reduce rates by rail from the Middle West to the Pacific Coast without being obliged thereby to lower the charges to intermediate places in the Rocky Mountain territory; and the Interstate Commerce Commission was petitioned to permit the reduction of some through rates without making a change in the intermediate charges. In other words, the Interstate Commerce Commission was petitioned to modify its decisions in the Spokane and Reno cases; and, after hearings held in October, 1914, the Interstate Commerce Commission, in an opinion rendered January 29, 1915, permitted the railroads under certain limitations to reduce the through rates to the west coast without lowering the charges to intermediate points in the Rocky Mountain territory on a list of articles, including the commodities for the transportation of which the competition between the rail and water lines is most active. This rate adjustment indicates concretely the effect which the Panama Canal has actually had upon the rates of the trans-continental railroads.

#### OTHER PAPERS

A paper on "Railways" was presented by William Barclay Parsons, consulting engineer, New York, N. Y. This paper contained a summary in figures to show how railways have grown in the various countries of the world, with their equipment, what the earnings have been and are, the rates charged for service, the conditions of employment of the working staffs and the varying methods of ownership and governmental control. The author recognized that many of the figures are approximate, that omissions are frequent and that some of the statistics are not comparable on account of the varying methods of reporting in different countries, but hoped that this first attempt to set forth a measure of the railways of the world may lead to other efforts whereby statistics as complete and full as possible may be compiled.

A paper on "The Status of the Railways of North and South



America" was given by F. Lavis, consulting engineer, New York City. The introduction of this paper is a discussion of the relation between the economic development of the two continents and its bearing on the financing and construction of railways. This was followed by a general review of the railway situation in each country. The observations in regard to the United States and a number of the South American countries were based largely on the writer's personal practice.

"The Status of Railroads and Tramways in the Netherlands East Indies," was presented by E. P. Wellenstein, Netherland Indian government railway's engineer. Railroads in the Netherland East Indies are characterized by light traffic, light construction and relatively high rates in order to afford a reasonable return on the investment. The lines are either government-owned or privately-owned, with charters providing for eventual government ownership. Some of the charters provide for government guarantee of dividends. Tramways form an important feature of the development.

"Economic Considerations Controlling and Governing the Building of New Lines," was the title of a paper by John F. Stevens, New York City. The conditions under which the present railway systems of the United States have grown up, he pointed out, are very different from those prevailing in any other civilized country in the world. Owing to the rapid growth of the country, the development of the railroads has been correspondingly rapid and decidedly haphazard. The situation at the present time is entirely different; the necessity for new main lines is not manifest and further development will be concerned almost entirely with branch lines and terminals. Railroad planning and building is an exact science and not a rule-of-thumb matter, and all projects for further development should receive most careful and conservative consideration before construction commences. This applies particularly to the establishment of ruling grades and maximum rates of curvature, the elimination of pusher grades and the initial construction of permanent work. Economize out on the line, but not at stations nor at terminals proper.

William Hood, chief engineer, Southern Pacific, in a paper entitled, "The Locating of a New Line," discussed the designing of the grade system and center line of a road whose terminals have been fixed, touching on the temporary use of sharp curvature to reduce cost, the co-ordination of grades to reduce to a minimum the number of classes of locomotives required, the use of easement curves, field work in locating the line, compensation of grades on curves, and the comparison of alternative lines.

G. M. Eaton (Westinghouse Electric & Manufacturing Company), in discussing Mr. Hood's paper, called attention to a factor which may influence the location of main trunk line railways in the future to a much greater extent than it has in the past, viz., the certainty that the line will be operated electrically. On account of the shorter wheelbase of electric locomotives, it may be practicable to adopt sharper curves, and in view of the great short time overload capacity of the electric locomotive, heavier grades for short distances need not be prohibited in such a line.

Mr. Hood replied to the above suggestions that while these factors could well be considered in locating a road which it is absolutely known will be operated only by electricity, this certainty is very difficult to determine in present-day work. Even allowing for important developments in the electrification of main line steam roads and the construction of new lines of this class for electric operation, it is probable that many will retain steam engines for some classes of service or may be forced to change back to steam operation entirely, so that a road located according to the best practice of to-day is still preferable. Such a line can be operated fully as economically by electricity as one designed according to the suggested factors, and he considered it injudicious to attempt to effect some slight savings in the cost of the line by adopting a location that cannot be operated economically with steam.

David Wilson, Johannesburg, S. A., submitted a paper on "The Locating of a New Line." This was an account of the standards and practices of the South African railways in the construction of new line. The methods follow very closely those of early railroad construction in the United States.

A paper on "Tunnels," by Charles S. Churchill, assistant to president, Norfolk & Western, gave an account of the most important tunnels now under construction or recently completed in America. Most of these have been previously described in engineering periodicals. The Snoqualmie tunnel on a change of line in the Cascade mountains, on the Chicago, Milwaukee & St. Paul, is single track, 11,890 ft. long, and was completed in January, 1915. It is in hard rock and was excavated with a bottom heading from one end and with a top heading from the other end. It is lined with concrete. The Sandy Ridge tunnel is on the Elkhorn extension of the Carolina, Clinchfield & Ohio, single track, and 7,804 ft. long. It was driven through sandstone and slate by the top heading and sub-bench method. The concrete lining was not placed until after the tunnel was opened for traffic. The double track Nicholson tunnel, 3,630 ft. long, on the change of line of the Delaware, Lackawanna & Western, is an example of a tunnel driven in soft rock, clay and gravel, requiring full timbering throughout. The Mount Royal tunnel, Montreal, and the Seattle tunnel are examples of tunnels built to gain access to important terminals. The Rogers Pass tunnel, now being constructed by the Canadian Pacific for a change of line in the Selkirk mountains, will be the longest tunnel in North America. The pioneer drift method is being used.

"Tunnels Recently Constructed in Italy," was the title of a paper by Prof. Dr. Luigi Luiggi, Rome, Italy. The Italian railways are characterized by the number and length of their tunnels, not only in the Alpine district but throughout the length of the Italian peninsula. Most of the tunnels described were of difficult construction because of their location in soft or disintegrating rock and limestone containing large caves. Of special interest is the Gattico tunnel, in which a 610-ft. section was constructed by use of pneumatic caissons driven vertically from the surface 200 ft. above the crown of the tunnel. The use of modern tunneling machinery, largely of American make, is quite general.

In a paper entitled, "The Railway Tunnels of Switzerland," R. Winkler, director of the Technical Division of the Swiss Railway Department, Bern, Switzerland, brought out the fact that the number of railway bridges and tunnels, determined by the topography of Switzerland, is very great, and there are certain lines which consist of practically an unbroken series of this construction. On January 1, 1915, there were 627 tunnels with a total length of 175.01 miles in operation or under construction.

The paper discussed the tunnels of more than 2,000 m. (6,560 ft.) in length, covering the most important conditions affecting construction work prosecuted during the last ten years.

"The Reconstruction of the Panama Railroad," was the title of a paper by Frederick Mears, member Alaska Engineering Commission, Washington, D. C. The reconstruction of the Panama Canal involved two separate processes. The first step was the rehabilitation of the old French line substantially on its original location, including the double-tracking of 37 miles, and the addition of extensive passing tracks and yards, to take care of the traffic incidental to the building of the canal. The second step was to rebuild the entire railroad on a new location in order to raise the line above the level of the water in the Gatun and Miraflores lakes and make a detour around Gold Hill to avoid the Gaillard cut. The most formidable problem was encountered in the great embankments across the arms of Gatun lake, involving over 5,000,000 cu. yds. of embankment, a large part of which was rock. Bridges were quite an item, the two largest ones being those over the Chagres and Gatun rivers, the latter including a 100-ft. plate girder bascule span. A tunnel 636 ft. long was required at Miraflores.

A paper on "Railway Construction Methods and Equipment in Australia" was presented by Maurice E. Kernot, chief engi-

neer, railway construction, Melbourne, Victoria, Australia.

In a paper on "Railway Construction Methods and Equipment," William G. Sloan, chief engineer, McArthur Bros. Co., New York, outlined the development and present status of railway construction in this country, discussing the subject under seven headings, viz., Clearing and Grubbing, Handling Material from Excavations and into Embankments, Tunnelling, Bridge Construction, Track Laying, Ballasting, and the Construction of Miscellaneous Structures.

Under the title "Track and Roadbed," George H. Pegram, chief engineer Interborough Rapid Transit Company, New York City, gave a brief review of American practice on this subject and covered both steam and electric lines, with special attention to electric lines having exceptionally heavy high speed traffic. A set of specifications for the treatment and use of cross-ties was given and the paper closed with a review of the present rail situation in America.

J. E. Greiner, consulting engineer, Baltimore & Ohio, Baltimore, Md., gave a paper on "American Railroad Bridges." As now constructed they are the result of an evolution which may be divided into three periods. The first, extending to 1865, was largely a period of temporary construction in which the designers were governed very largely by judgment. During the second, ending in 1890, scientific designing became general, and the pin connected steel truss was developed. The third period brings us to the present. The influences bringing about the present state of development may be designated briefly as the increase in train loads, necessitating heavier structures; the increase in speed necessitating stiffer ones; the introduction of new materials of construction, such as modern structural steel and the alloys and special steel of recent introduction, and reinforced concrete; the improvement in machinery for shop use, and the development of derricks and other equipment for the erection, which has very largely increased the weight of members and the use of field rivets. As examples of modern tendencies, the most important ones include the reinforced concrete and timber ballast decks, the encasing of I-beam spans in concrete, the use of long plate girders, the decreased use of pin connected trusses, and the substitution of riveted trusses for greatly increased span lengths, the exploitation of many patented types of bascule bridges and the general tendency to use stiff connections and bracing wherever possible. An account of the development of the Cooper wheel loading was followed by a discussion of the present tendency of locomotive development and unit stresses in structural steel to the conclusion that little or no increase in the strength of bridges over that provided at present is necessary to fully anticipate all possible increase in the rolling loads on railroad tracks.

Mr. Greiner's paper was discussed by C. F. Loweth (C. M. & St. P.), who took exception to the inference in the paper that open deck timber trestles should only be built on lines of light traffic or branch lines. While it is recognized by all engineers that a more permanent type of structure is preferable, the necessity for utilizing to the best advantage the limited amount which is available for bridge work on the average railroad each year frequently requires the use of structures which would not be built if additional expenditures were allowable.

While the contents of a paper on "Recent Locomotive Developments," by George R. Henderson, consulting engineer, The Baldwin Locomotive Works, Philadelphia, is a matter of common knowledge to railroad men in the United States, the paper was an excellent one from the standpoint of the foreign railroad officer. It described the transition from the American, Consolidation and Ten-Wheel types to the corresponding types having trailing trucks, namely, the Atlantic, Mikado and Pacific types, with the resulting increase in boiler capacity, giving higher speeds with equal tractive effect or vice versa. An outline was given of the development of the Mallet type, with a somewhat more lengthy description of the "Triplex compound." Under the headings, "Details of Construction" and "Adjuncts and Specialties," mention was made of the substitution of cast steel for wrought steel, the use of alloys and heat treated steels, the substitution of the

Walschaert valve gear for the Stevenson link motion, improvements in boiler and firebox design, the superheater, the pneumatic coal pusher and stoker, and the use of oil as a fuel.

The paper by Arnold Stucki, consulting engineer, Pittsburgh, Pa., on "Rolling Stock Other than Motive Power," dealt with the car equipment used by the railroads of the United States of America and Canada pointing out the improvements made during the last decade in the various types of passenger and freight cars and special parts.

"The Floating Equipment of a Railroad," was the title of a paper by F. L. DuBosque, assistant engineer of floating equipment of the Pennsylvania, New York City. Most of the railroads approaching New York from the west and south have their terminals on the west side of the Hudson river, necessitating a water transfer for all passengers and freight having destination east of the river. In consequence these railroads have developed a number of standard types of floating equipment. The most common of these is the Hudson river passenger ferryboat with a screw propeller at each end, a steel hull and a wooden superstructure. An all-steel fireproof ferryboat used on the Delaware river is suggested as an improvement over the prevailing Hudson river type. Car floats for freight service are of two types, pier floats and transfer floats. The former are used for delivery to freight stations on piers where the cars are unloaded without removal from the floats. The latter are used for the transfer of cars from one side of the river to tracks on the other side, and are larger and of heavier construction, usually steel. One of the most interesting problems involved in the operation of floats is the construction of satisfactory bridges for the transfer of cars to and from the floats with varying heights of tide. The delivery of freight to steamship piers and to manufacturing plants is usually made in house barges propelled by tugs or in self-propelled barges, the latter usually being constructed of steel. Other types of equipment are the hand-power and steam-power derrick barges and coal barges. All equipment which is not self-propelling is handled by means of tugs of various sizes, many of them very powerful, so that tows sometimes contain as many as 28 boats. A small size of tug is employed at the docks for service which corresponds very closely to the switching of cars.

The paper on "Railway Terminals," by B. F. Cresson, chief engineer, Board of Commerce and Navigation of the State of New Jersey, contained a general discussion of the relation of terminals to railroad systems and to economic conditions in the larger cities and a detailed statement of the terminal situation in six cities, New York, Chicago, Buffalo, Cleveland, St. Louis and New Orleans.

Charles Hansel, in a paper on "Signals and Interlocking," gave a brief review of the development of the automatic block system, placing particular stress on the development of the alternating current signal track system and the adoption of the upper quadrant semaphore signal. The automatic train control was designated as another important development, which was discussed at some length.

A paper on "Preservative Treatment of Timber," by Howard F. Weiss, director, Forest Products Laboratory, and Clyde H. Teeddale, in charge of wood preservation, Forest Products Laboratory, Madison, Wis., presented a general review of the results obtained in the United States in preserving wood. The authors attempted to do this by showing, first, the quantity of wood preservatives used and amount of timber treated annually, and, second, the extent to which the various treatments have prolonged the natural life of wood.

**RAILWAY CONSTRUCTION IN INDIA.**—The following work on railway projects has been sanctioned by the Indian authorities: Surveys by the Eastern Bengal State Railway of the 36 miles between Serajgunj and Bogra, and by the Bhavnagai Durbai of a metre gage railway, about 56 miles long, from Savarkundla via Dongar to Mahuva, with a branch from Dongar to Port Albert Victoria, and the construction by the Junagadh of a line, 60 miles long, between Varavaland and Una.



## WELFARE WORK AT PITCAIRN FREIGHT TRANSFER

The remarkable improvement made during the past two or three years in the management of the personnel at the freight transfer station of the Pennsylvania Railroad at Pitcairn, Pa., 16 miles east of Pittsburgh, was noticed in the *Railway Age Gazette* of September 3, pages 413 and 430. Here, under the management of George F. Wagner, agent, a force of 318 laborers has been kept in service for two years with no change; only one man was taken on, and he was an addition to the force. It is hardly correct to call these activities "welfare work" in the restricted and technical sense in which that term is now used, for the welfare of the employees is only one of the beneficial results. The results from a cold and strictly business standpoint are equally noteworthy, and all that has been done would have been fully justified as a good thing for the railroad company from the narrowest motives of self-interest. And 99 per cent of these men are foreign born, another fact which will give interest to the additional details here given concerning this station and its management.

The work done at this transfer station was formerly done at Pittsburgh, but was crowded out of the city several years

The assistant labor foremen and the shipping clerks, one of whom is assigned to each gang of four truckers and one loader, are all Americans.

Under former conditions the proximity of the numerous large manufacturing concerns fostered the habit of "floating" and it was not uncommon to lose a hundred men a month, principally because another job was close at hand and to be had for the asking. The men who left did not usually better themselves; they merely wanted change, apparently; and many of them would in time drift back to the Transfer and be re-employed, if they were needed, and if they were of satisfactory quality. It goes without saying that this constant "floating" was demoralizing to the whole force.

The Pitcairn sheds are not noted for beauty, being plain, low wooden structures. The agent who set out to improve conditions had, therefore, no aid either from the architect or from any committee on art or esthetics; but he made a good beginning by covering the whole with a coat of white-wash. This, they say, acted like a tonic on all hands, and seems to have suggested other ideas of tidiness. It began to be easier to keep tracks and platforms clear of rubbish and all foreign matter; and an order was issued to burn or send to the dump every day all sweepings and litter. Getting rid of the rub-



Some of the Freight Handlers at "Pittsburgh Transfer," Pitcairn, Pa., Pennsylvania Railroad

ago. Pitcairn is the main freight-train terminal for the Pittsburgh division. Between Pitcairn and Pittsburgh there is a long chain of manufacturing towns which have a distinct influence on the labor problem at the Transfer. The labor supply in this district has, for many years, been very largely foreign and the percentage of native-born laborers has decreased steadily year by year. The total number of men employed at the transfer is 464, of whom 318 work on the platforms as truckers and laborers. Nearly all of these are natives of central Europe, the large majority coming from Austria-Hungary. A creditable number of them have become citizens of the United States, yet a considerable part of the whole body has only a limited knowledge of the English language. This ignorance of English was, of course, a drawback, as the trucking of miscellaneous freight into and out of cars demands something more than mere brawn; but at the present time all can read and speak English with satisfactory proficiency.

The agent's force, aside from the clerical department, consists of one general foreman in charge of floor operation day and night, and two assistant general foremen, one day and one night. There are ten assistant labor foremen, five day and five night, in charge of the work in different parts of the house.

bish, it was found, soon brought another improvement; the rats were exterminated. This was an emigration of no small proportions, as the station is a large one (the platforms accommodate 402 cars).

Next came the Spring; and a little plot of grass and of blooming flowers was soon seen where only cinders had bloomed before; and the workmen at once took an interest in this minor feature. The men, discussing the matter among themselves, concluded that an American flag was needed, and with contributions of ten cents apiece, no more and no less, a fund was raised to buy it; and with a tubular steel pole, furnished by the railroad company, the flag was raised. The flag raising, though not ostentatious, was, from a local standpoint, a notable event, and there were a few brief speeches and some music by the Pitcairn shop band.

The appreciation accorded these outside activities served only to emphasize such lacks as there were inside, and before long the agent mustered the courage to acquaint the superintendent with the needs inside the building; and with the cordial co-operation of this officer and others, there was soon installed a ventilated steel locker for each man; and this improvement was followed with shower baths, porcelain enamel washstands,

supplied with hot and cold water, and a system of absolutely odorless water closets and urinals. The drinking water is now supplied by sanitary fountains and the water, which comes direct from the mountain back of the village, is cooled by iced coils.

The men have a comfortable room in which to eat their luncheons, and facilities are provided for heating food and for simple cooking. The truckers have one large lunchroom lined with cement, both the floor and the wainscoting. All these fixtures are of first quality and the facilities are adequate to the number of men who wish to use them.

Every one of these improvements is now in as good condition as when it was new, and cleanliness is maintained every day. The floor of the cement-lined lunchroom just mentioned is sanded every day with white sand.

When the men are idle they may smoke in rooms provided for that purpose; and in these rooms they play checkers, dominoes and other games of skill. Outdoors there is a place where they may pitch quoits.

The Victor Victrola which furnishes music at noontime was bought by the men themselves; and with it there is a good assortment of records. That the workmen have music in their souls is evident from the pleasure that they take in listening to great artists and famous bands. Now and then the sheds are favored with a concert by the Pitcairn shop band, of 40 pieces, and this also is warmly appreciated.

These contributions to the comfort of the men have in a very definite way promoted contentment, and the officers of the road feel quite sure that whatever cost has been incurred was wiped out long since. Not the least effective means of keeping in sympathetic touch with the men is a "suggestion box" provided for the purpose of enabling any employee to submit ideas that may occur to him in the way of improving methods of work; and Mr. Wagner says that he is indebted to the men for many excellent ideas. He is personally acquainted with each one of the 318 men comprising the house force, and he takes care to keep the acquaintance alive; that is to say, he makes it a point to have a little talk with each man at least once a week. Tale-bearing is not tolerated. Where a foreman notices a tendency to carelessness the man at fault is warned; and if, after continued warning, there is no improvement the offender finds himself reduced in rank. Thus an offending shipping clerk may become a stowman, a stowman a trucker and a trucker a laborer. All understand, however, that a position which has been lost may be regained by subsequent good conduct; and, in fact, men do thus recover their places. Commendation for good work is given freely, and there are said to be no vicious cases to deal with.

Every available means is taken to facilitate the freight work. Hinged counterbalanced bridges are provided for trucking across tracks, so that the fact that one of two or three tracks is not occupied by cars, does not hinder ready access from the platform to cars beyond. The abolition of the old practice of trucking through several cars, hindered as it is by the obstacles due to differences in heights of floors and sometimes bulky freight in cars which have to be passed through, has made easier the work of trucking, has added to the earning capacity of the men, and has reduced the number and importance of bills for damage to freight and injury to persons.

Most of the trucking along the platforms longitudinally, that is, in lines parallel to the track, is done on flat steel tread plates laid in the shed floors and countersunk. With these it is found that in many cases a trucker can move a load twice as heavy as he would dare to take over the ordinary plank floor.

The men are grouped in gangs, and are paid by the ton of freight handled. A gang is composed of a shipping clerk, a loader and four truckers. Each gang knows approximately what is its standing as compared with other gangs, and enough rivalry is kept up to secure a good degree of accuracy in the work. There have been seasons, when freight was unusually

heavy, when some outside men had to be employed; and, on the other hand, during dull periods the regular men are laid off, one day at a time, each man taking his turn.

As may well be supposed, the men have now been so long at this station that their acquaintance with details is complete. Every man knows exactly where to find a car for any point to which cars are loaded; and he knows that right in that same spot he will find a car for the same point to-morrow, next week or next month; that is to say, indefinitely, until a formal change is ordered and announced.

Every man knows his duty and also knows that it is the duty of the foreman to exact constant faithfulness. No one is pampered; there is no confusion, no lack of order and no idleness when there is work to be done.

## THE FRENCH RAILROADS AS SECURITY BROKERS

By WALTER S. HIATT\*

The old practice of the French railroads of selling new issues of stocks and bonds directly to the public through the railway stations is proving very useful in connection with present issues of new loans and as a means of helping the government in its campaign to collect gold coin. Because the small investor in France has been educated through long years to buy railroad stocks and bonds directly from the companies, as has been pointed out in an article in the *Railway Age Gazette* of August 6, in the present war crisis the railroads forced to make new loans are able to get money in France without too much difficulty.

Contrary to the impression of the outside world, which has underestimated the enduring power of accumulated wealth, there is still an astonishing amount of money in the hands of the saving French people, and large amounts of it are going into the purchase of railway securities. One notable indication of the presence of this money yet in the hands of the public is shown in the statement of the Bank of France which is collecting gold for the government. Last May the government called on the public to let it have its hidden gold, to aid it in maintaining its credit abroad. To date no less than \$150,000,000 worth of gold has been turned in at the hundred odd branches of the Bank of France. It is estimated by French financial experts that counting the gold actually coined in France during the past 15 years and the billion dollars worth of gold in bank vaults, another billion dollars worth is yet in the hands of the public.

In view of their rôle as brokers in handling their own securities the various railroad companies are helping in the gold collection by opening special windows in all their larger stations for the exchange of their own securities or paper money for gold coin, which coin is duly turned over to the Bank of France. No less than \$5,000,000 in gold has been obtained at the instance of railway employees, either through soliciting their friends or else taking the gold out of their own savings. The railway companies are also turning in gold out of their own treasuries, the Northern Railway having as early as May 21 made a first deposit of 3,000,000 francs, and later the Paris-Lyon-Mediterranee of 3,500,000 francs.

In regard to their own finances, practically every railroad in France, because of reduced earnings and the necessity of repairs and upkeep, has put out new loans this summer. These loans have done reasonably well, because of the old selling relation with the public. Had the railroads been forced to place the loans entirely through bankers, the money would perhaps have come in more slowly, and it certainly would have been necessary to pay far more than the customary rates for the service.

The case of the Northern Railway, normally the best paying of all the French roads, is interesting because it has suffered most from the war. Virtually one-half of its 2,300 miles of

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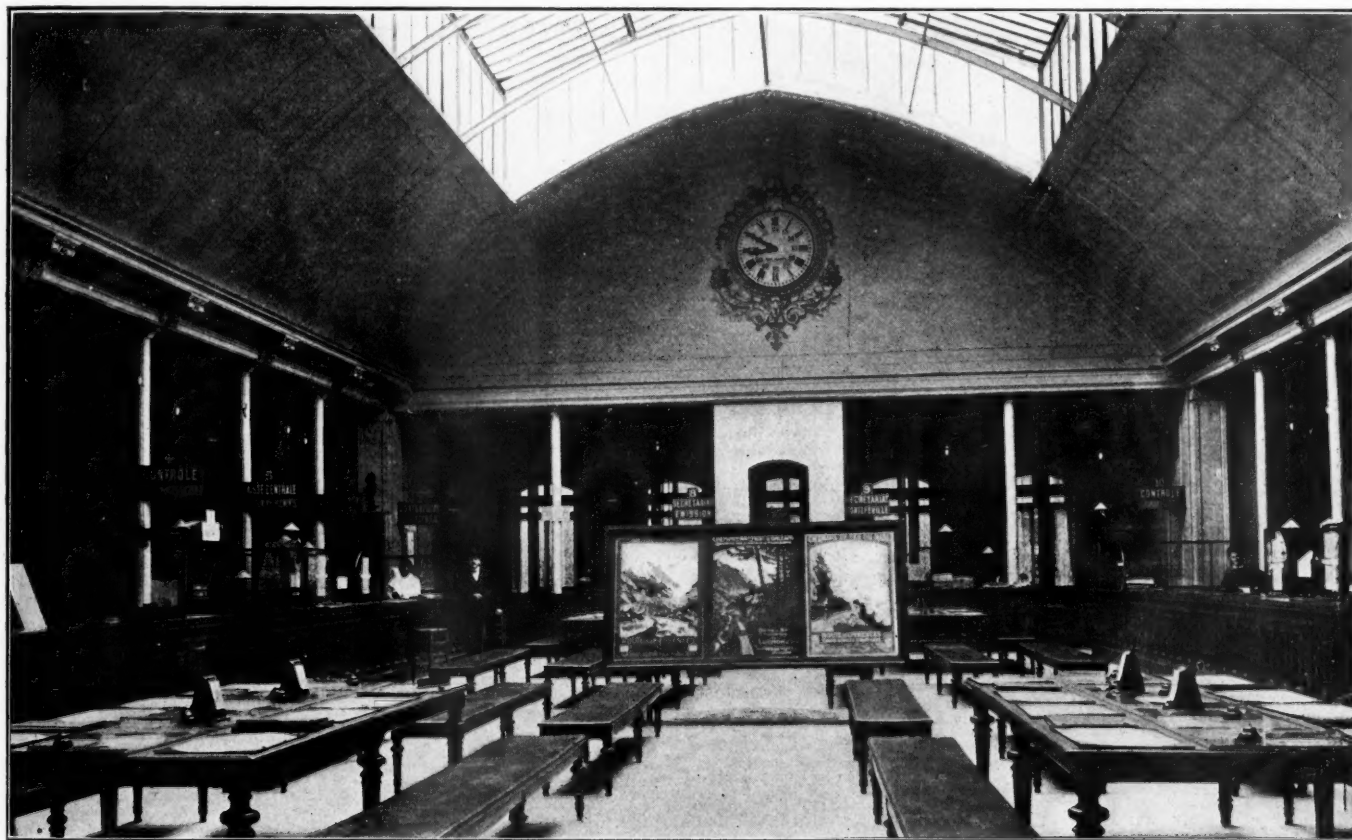
line are either in the hands of the Germans, or else so near the front as to be impossible of normal operation. The other half of its available line runs from Paris into the war zone, and yields a smaller return than usual, since the army is using it for military purposes, refusing its passenger trains to travelers and its freight trains to commercial traffic except under strict surveillance.

The result is that the earnings of this railroad are less than half those of a peace year. In 1912 the net earnings were \$25,000,000, the gross receipts being \$65,000,000, and expenses \$40,000,000. For the year ending December 31, 1914, including five war months, the receipts fell off \$19,000,000, the total for the year being barely \$48,000,000, with expenses of \$37,000,000. Of this sum but \$6,000,000 was received from the government for war transportation, which sum cannot in any sense be considered an adequate compensation for its huge losses of freight and passenger business and the destruction of its depots,

this stock has not further decreased because the French holder does not readily sacrifice a stock that he feels will eventually return to normal. For these reasons this company's new \$40,000,000 issue of 5 per cent bonds, made to meet war deficits of all kinds, has fared far better than could have been expected.

These bonds are on sale at every railroad station of the company, according to French railroad custom, and hand bills are there posted notifying the public of the issue. At the smaller places the station masters, as on all the roads, have charge of the sale and receive small commissions from the company for bonds sold. The company is thus able to reach the small investing public of the little towns and villages. The people do not have to apply to bankers or brokers to make the purchase and, indeed, effect a small saving by this direct buying from the company. Neither the company nor the public is forced to pay a broker's commission on these sales.

At the stations in the larger cities, as in Paris, the companies



The Bank and Security Sales Room in the Paris Offices of the Southern Railway of France

bridges and tracks. The decreases in revenues as between 1913 and 1914 were as follows: Passenger traffic, \$7,500,000; slow freight, \$16,000,000; fast freight, \$2,500,000; cattle, \$200,000; mail and other, \$200,000.

The enormity of these decreases will be realized if it is understood that normally this road's passenger receipts are \$20,000,000, and its freight receipts \$36,000,000. At one stroke the German invasion cut off \$12,500,000 in coal and coke freights from the mines of northern France and Belgium. It must be borne in mind that, notwithstanding these losses, operating expenses have continued over one-half its lines.

In the face of such disaster, its stock (*actions*), originally issued at \$80 (400 francs), and quoted at the high figure of 1,727 francs (\$345) the day before war was declared, are now quoted on the Bourse at 1,215 francs, a drop of about \$100. That this stock has not decreased more after 14 months of war is due to the confidence of the holders in the value of the stock, and to the fact that the company is paying its interest as usual, not having sought to take advantage of the moratorium. Finally

have big reception rooms fitted up to accommodate this business, the room being not unlike that of a bank, with special windows for each class of buyers and each class of securities, and for the payment of interest as the securities mature. Not only the small buyers come to these rooms, but brokers, bankers and officers of private organizations who wish to make larger investments of capital. Of course, the companies do not attempt to supplant altogether the selling role of the broker or banker. Thus, once the new stocks or bonds have been issued and sold, the companies do not attempt to handle them further. The only railroad in France that does not to-day use this method of reaching the public is the State Railway, which, however, does business directly with the public at the offices of the Minister of Finance.

One of the good features of this method, from purely a railroad point of view, is that railroad employees themselves are led to invest their savings in the company for which they work and thereby their personal interest in the welfare of their employer is stimulated. It has also been pointed out to me by

officers explaining the direct method of sales that the people living along a railroad line and investing in its securities naturally desire the prosperity of the railroad, and that this reduces the number of people who loosely consider the railroad a public enemy.

In the case of the Southern Railway (Chemin de Fer du Midi), the rôle of broker has been carried out so far that the railway virtually has a bank in its general offices in Paris. Here it is its own banker. It not only sells its stocks and bonds but makes short-time loans to other banks and commercial houses as a part of its daily business.

To illustrate how well its system works, one of its directors explained to me that, two years ago, the company decided to build a new hotel at a certain point on its line as an attraction for tourists. It organized a private hotel company and asked a banking firm to sell for it the 14,000 bonds issued to obtain money to build the hotel. The banking firm was able to sell but 5,000 of the bonds. Then the railway undertook the sale itself, at its own stations, and within a few months was able to dispose of the other 9,000 bonds. At this Paris banking office the company further settles all of its large bills, again acting as its own banker.

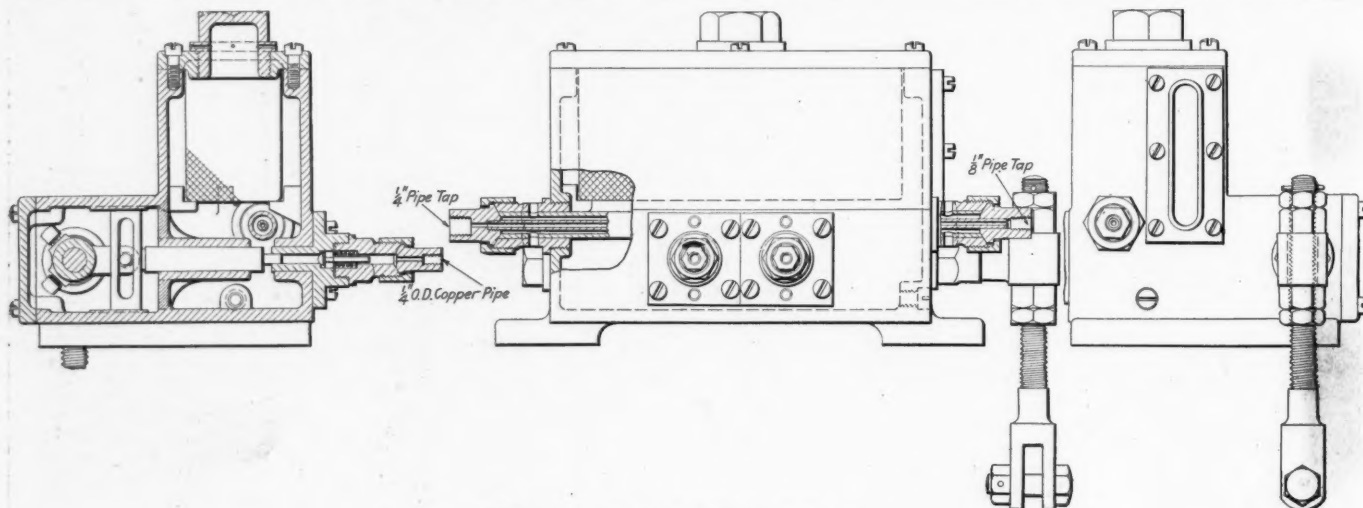
The company has had the direct sales system in force since 1860, and has during that time handled all of its own loans. Whenever it has put out a new loan, say 100,000 bonds at 500

majority of the investors with maturing bonds had immediately reinvested in new ones and thereby placed sorely needed money at the disposal of the company.

### FORCE FEED CYLINDER LUBRICATOR

The force feed lubricator, shown in the drawing, is designed for use in lubricating locomotive cylinders. It is of the double action type and is manufactured by the Nathan Manufacturing Company, New York.

By referring to the detail drawing of the lubricator it will be seen that it is directly operated without the use of a ratchet. The lever attachment to the lubricator is designed to be connected in any suitable manner with a reciprocating part of the engine, the length of the arm being adjustable to suit the amplitude of the motion. The oscillating shaft to which the lever is attached is provided with arms in the lubricator which are pin-connected to slotted crossheads on the ends of the pump plunger, the arrangement being such that for each complete cycle or revolution of the engine two complete cycles of the pump plungers are produced. Oil is thus forced into the steam passages twice during each revolution by the use of but one plunger for each cylinder. The plunger is shown in the drawing at the end of its forcing stroke. At the other end of the stroke it is drawn back from the end of the barrel, thus allowing the



Nathan Force Feed Cylinder Lubricator

francs, it advertises the fact on the billboard space at all its stations.

There are four windows at this Paris office maintained for the investor. While the clerks at these windows in slack times do other company accounting work, the same clerks are always at hand and ready to engage in the work of selling with which they are familiar. The customer begins at the first and central window, stating the amount of money he wishes to invest, and whether he wishes a bond issued in his name or merely in blank. He then passes to window number two, where he pays for the bond or bonds, and receives a receipt. At window number three he receives his bond. He comes back to window number four to collect his interest twice a year, or else collects it by mail. At this window there is also maintained, as a protection to the investor, an information service regarding lost or stolen securities. If an outside banker pays the interest on a coupon or purchases a security, he does so at his own risk.

The officers of the Southern Railway who went into the details of their system, when I explained that it seemed on the surface that it might be modified for the use of American railways stated that the system had stood the test of long years and that it was satisfactory from many points of view in the way of stimulating public confidence and interest in their business. They further declared that it was inexpensive, and that in this war year it had rendered great service in that the ma-

oil to enter directly from the reservoir. A spring operated check valve prevents the back flow of oil from the lubricator pipe.

The oil reservoir contains a small exhaust steam heater of a novel design. Steam from the air pump exhaust passes through a small pipe extending from end to end of the reservoir, the condensation being carried from the lubricator to any convenient point under the engine. Surrounding the steam pipe is a larger pipe with openings to the atmosphere at either end of the reservoir, providing for a circulation of air about the steam pipe and preventing overheating of the oil in the lubricator.

**THE RAILWAY GAGES OF THE INDIAN PROVINCE OF ASSAM.**—At a railway conference begun on June 30, at Shillong, in Assam, and attended by members and representatives of all the various interests in Assam, including steamer companies, it was decided that there should be only two gages in Assam, the metre and 2 ft. gages. The gage of any proposed line is to be selected on its merits, but in general the metre gage will be adopted for the Surma Valley and the 2 ft. gage for the sparsely populated portions of the Assam valley. It was also decided to lay the meter gage on the feeder lines in the Surma valley, connecting the three subdivisional headquarters of Hailakandi, Maulvibazar and Habiganj with the Assam-Bengal Railway.



# General News Department

The State Department, at Washington, which is trying to decide which faction should be recognized as the government of Mexico finds its efforts blocked by the impossibility of keeping up railroad communication between Vera Cruz and the city of Mexico. A freight train carrying supplies from the coast to Mexico City was blown up by bandits. A long bridge of the Inter-oceanic Railway, 25 miles from Vera Cruz, was destroyed. A press despatch from San Diego, Cal., reports that at Torres, a small town 70 miles north of Guaymas, Mexico, a Southern Pacific passenger train was burned September 24, by a band of Yaqui Indians, and that 80 passengers, forced to stay in the cars were thus put to death.

C. Stanley Sale, who since November, 1913, has been editor for the Chicago Association of Commerce Committee of Investigation on Smoke Abatement and Electrification of Railway Terminals, and who for two years, 1907-1908, was associate editor of the *Railway Age*, has been appointed assistant to the director of the engineering experiment station and instructor in civil engineering at the University of Illinois. Mr. Sale was graduated from Purdue University in 1906, and was for one year assistant engineer of the Florida East Coast Railway. Before becoming connected with the electrification committee he was for two years secretary and general manager of the Engineering Publishing Company, Indianapolis, Ind.

Disturbances among freight handlers on the docks of New York City, reported last week, have continued, but, so far as the railroads are concerned, the employment of new men,

or of men drawn from other departments of the railroad service seems to have been successful in keeping freight moving, though with considerable delay. Many of the men who struck are returning and being taken back. In addition to the railroads named last week, large numbers of men left their work at the docks of the New York, New Haven & Hartford Railroad and of the Metropolitan and Maine Steamship companies. The demands of the strikers in most cases were for an increase of the rate of pay from 20 cents an hour to 25 cents. No strong organization of laborers seems to be prominent, yet it is reported from Washington that the secretary of labor has appointed a conciliator, John A. Moffatt, to take up questions presented by 900 freight handlers of the Pennsylvania Railroad in Jersey City. The difficulties this week seem to have been more serious at the piers of the transatlantic steamship lines and the claim has been made that agitators, working supposedly in the interest of Germany and Austria, have incited the strikes. It is said that at piers where no materials for the French and English governments were being loaded there was no trouble.

## Revenues and Expenses of Express Companies for May, 1915

The following statement, which is subject to revision, has been compiled by the Interstate Commerce Commission from the monthly reports of operating revenues and expenses of the principal express companies for May, 1915:

A—FOR THE MONTH OF MAY										
Item	Adams Express Co.		American Express Co.		Canadian Express Co.		Globe Express Co.*		Great Northern Express Co.	
	1915	1914	1915	1914	1915	1914	1915	1914	1915	1914
Mileage of all lines covered (miles)	44,936.22	38,326.94	73,909.69	61,199.83	8,876.50	7,080.31	2,839.78	2,839.78	9,557.73	9,334.20
Charges for transportation.....	\$3,092,137	\$2,635,551	\$4,274,145	\$3,497,550	\$273,231	\$271,973	\$3,299	\$50,592	\$263,126	\$256,611
Express privileges—Dr.....	1,462,863	1,372,393	2,149,067	1,730,687	127,623	126,930	3,784	25,639	159,676	155,875
Operations other than transp.....	46,165	32,801	244,000	171,720	5,125	10,802	49	785	4,859	4,438
Total operating revenues.....	1,673,439	1,295,958	2,369,078	1,938,583	150,733	155,846	435	25,738	108,309	105,174
Operating expenses.....	1,463,598	1,354,975	2,039,133	1,888,776	127,533	130,933	5,809	27,970	86,132	86,391
Net operating revenue.....	211,840	59,016	329,945	49,807	23,199	24,913	6,245	2,231	22,176	18,783
Uncollectible revenue from transp'n	687	.....	413	.....	6	.....	.....	.....	13	.....
Express taxes.....	13,733	11,426	49,480	30,952	4,000	3,000	250	600	3,443	3,348
Operating income.....	197,419	70,443	280,051	18,855	19,193	21,913	6,405	2,831	18,717	15,435
Item	Northern Express Co.		Southern Express Co.		Wells Fargo & Co.		Western Express Co.		Total for All Companies Named†	
	1915	1914	1915	1914	1915	1914	1915	1914	1915	1914
Mileage of all lines covered (miles)	8,188.34	8,080.40	34,679.60	33,496.60	114,923.23	99,969.21	5,174.26	5,008.97	300,175.57	296,677.58
Charges for transportation.....	\$231,863	\$245,880	\$1,273,385	\$1,331,122	\$3,476,102	\$2,548,093	\$109,664	\$97,309	\$12,996,966	\$12,378,075
Express privileges—Dr.....	126,601	133,399	664,328	683,408	1,778,131	1,347,656	49,466	51,936	6,521,543	6,373,392
Operations other than transp.....	3,505	3,380	25,130	26,957	68,692	59,121	3,259	2,500	400,789	332,903
Total operating revenues.....	108,778	115,861	634,187	674,672	1,766,663	2,259,559	53,457	47,873	6,876,212	6,337,586
Operating expenses.....	83,356	87,429	526,435	549,343	1,501,777	1,181,013	52,131	46,790	5,887,909	6,172,692
Net operating revenue.....	23,421	28,432	107,751	125,329	264,885	78,545	11,326	1,083	988,303	164,894
Uncollectible revenue from transp.	44	1	66	.....	599	.....	10	.....	1,804	1
Express taxes.....	5,000	4,500	14,147	15,247	31,563	35,000	925	1,155	122,544	115,953
Operating income.....	18,377	23,930	93,537	110,081	232,762	43,545	10,390	73	863,955	48,940
B—FOR THE ELEVEN MONTHS ENDING WITH MAY										
Item	Adams Express Co.		American Express Co.		Canadian Express Co.		Globe Express Co.*		Great Northern Express Co.	
	1915	1914	1915	1914	1915	1914	1915	1914	1915	1914
Charges for transportation.....	\$31,443,347	\$30,510,076	\$42,472,971	\$38,088,587	\$2,844,241	\$2,910,153	\$596,398	\$607,947	\$2,839,093	\$2,941,852
Express privileges—Dr.....	15,670,229	16,011,610	21,327,319	19,089,563	1,417,936	1,380,318	301,142	306,810	1,731,170	1,799,157
Operations other than transp.....	459,002	335,615	2,088,674	1,983,299	55,119	102,864	8,102	9,048	47,848	46,091
Total operating revenues.....	16,232,120	14,834,081	23,234,326	20,982,323	1,481,424	1,632,699	303,359	310,185	1,155,772	1,188,786
Operating expenses.....	16,558,991	15,539,356	22,539,592	21,232,199	1,411,289	1,530,443	296,558	328,210	972,476	985,253
Net operating revenue.....	326,870	525,274	694,733	249,875	70,135	102,256	6,800	18,024	183,285	203,533
Uncollectible revenue from transp.	3,558	.....	2,615	207	95	.....	.....	.....	103	.....
Express taxes.....	182,522	180,825	378,541	344,234	44,000	31,700	10,850	11,400	41,446	41,750
Operating income.....	514,952	706,100	313,375	594,317	26,040	70,556	4,049	29,424	141,745	161,782
Item	Northern Express Co.		Southern Express Co.		Wells Fargo & Co.		Western Express Co.		Total for All Companies Named†	
	1915	1914	1915	1914	1915	1914	1915	1914	1915	1914
Charges for transportation.....	\$2,493,745	\$2,721,931	\$12,964,423	\$14,465,480	\$34,966,740	\$28,678,514	\$1,063,588	\$1,090,070	\$131,684,550	\$139,839,828
Express privileges—Dr.....	1,362,709	1,480,025	6,701,404	7,430,335	17,891,945	14,429,451	546,681	604,404	66,950,540	71,371,593
Operations other than transp.....	36,381	36,637	277,985	305,029	660,966	607,162	34,071	26,180	3,668,152	3,727,645
Total operating revenues.....	1,167,417	1,277,543	6,541,004	7,340,175	17,735,760	14,856,226	550,977	511,846	68,402,162	72,195,880
Operating expenses.....	970,297	994,093	5,787,900	6,328,855	16,304,982	13,517,927	569,968	542,158	65,412,057	70,318,635
Net operating revenue.....	197,119	283,449	752,103	1,011,328	1,430,778	1,338,298	18,991	30,311	2,990,105	1,877,245
Uncollectible revenue from trans.	105	39	594	127	9,557	.....	102	.....	18,822	374
Express taxes.....	55,000	49,500	160,035	166,149	382,579	368,000	10,911	9,727	1,265,888	1,323,729
Operating income.....	141,924	233,910	592,473	845,040	1,038,642	970,298	30,004	40,038	1,705,395	553,142

\* Discontinued active operations April 30, 1915. † Includes previous years' returns of United States Express Co.

### The Erie Barge Canal

The New York State Court of Claims has before it 2,440 claims demanding \$62,000,000 from the state for damage occasioned by the construction of the barge canal. The next term of the court opens in Rochester on October 4. Claims for lands taken in New York county for barge canal terminal purposes aggregate \$2,106,000 and in Queens \$1,190,000. Other large sums claimed are \$10,000,000 in Herkimer, \$5,326,000 in Saratoga, \$3,678,000 in Wayne, \$3,861,000 in Monroe, and \$5,761,000 in Rensselaer. Claims arising from leakage and damage caused by the old canals amount to \$128,623.

### Brownell's Automatic Stop

A mechanical-trip automatic train stop, invented by George W. Brownell, of St. Albans, Vt., has been tried on a sidetrack of the Central Vermont Railway at that place. Mr. Brownell places a ramp on the ties between the rails of the track and, by means of a sliding tripper, suspended from the locomotive frame, causes the lifting of a valve on the engine as the ramp is passed, applying the air-brakes. The ramp is moved into or out of position by a dog, turned by a shaft connected to the visual signal. To prevent trouble from freezing, the ramp is supported in a trough, which, in winter, contains salt. The air apparatus, on the locomotive, moves a piston in a double cylinder, so arranged as to exhaust, at first, only a part of the air necessary to make a service application, further reduction, as may be demanded, being provided for by suitable adjustments.

### Railroad Abuses Charged

The United States Commission on Industrial Relations (the Walsh Commission) has filed, at Washington, what is said to be its final report. It recommends inspection of railroad labor camps by the United States Public Health Service and contains drastic criticism of construction camps, railroad benefit associations conducted by the managers of the roads, and so-called private armies maintained by railroads. The commission recommends the assumption by the States of the task of protecting private property as a remedy for the alleged evils. Some of the abuses declared to exist are the following:

Unsanitary railroad construction camps, overcrowded and improperly equipped; overcharging at the commissary and grafting by foremen, "voluntary" benefit associations in which membership is often compulsory and in which the employees have no voice; the establishment by some railroads of large arsenals of arms and ammunition, the recruiting of gunmen from detective agencies, the usurpation by these forces of the functions of the State and the various encroachments on the rights of private citizens.

To carry out the ideas of the commission a number of bills will be introduced in Congress.

### Crossing Accidents on the Long Island

J. A. McCrea, general manager of the Long Island Railroad, has issued a review of his experiences with reckless automobilists during the past summer, giving detailed accounts of cases of carelessness, inexperience, or deliberate recklessness, of drivers, which has led to deaths, injuries and damage.

Since January 1 eighty-five automobiles and several motorcycles and wagons have been deliberately driven through lowered gates. In fifty of these cases the gates were broken.

For publication of warnings and exhortations in the advertising columns of newspapers the railroad has spent in the last three months, \$4,327; this went to 176 newspapers in New York City, Brooklyn, and on Long Island. Twenty-five crossing gates have been painted with black and white stripes.

Heavy gates made of telegraph poles have been placed at one of the crossings leading to Long Beach, and another at Central Islip. Thirteen large signs, most of them electrically lighted at night, have been put up. The hours between five and eight in the evening seem to be most productive of reckless driving. On several occasions the crossing watchmen have been run into while at their posts and have been either killed or injured. On September 9, at Hempstead Turnpike, Queens, 5:15

P. M., an automobile driven at high speed struck and killed crossing watchman, J. P. Joyce, who was warning the driver to keep back, so gates could be lowered for an approaching train.

"We want the people to know just what we have done," said Mr. McCrea, "so that they will not accuse the railroad of carelessness when some of the reckless drivers are hit by trains. To prevent automobile accidents we have adopted every suggestion that was at all feasible; but it is quite clear that the railroad alone will not be able to do very much. Accidents will occur unless the State and township authorities take up the subject vigorously. We are going to continue our campaign, and I hope next summer we shall be able to think of something sufficiently startling to arrest the attention of those reckless drivers with whom it seems utterly useless to reason."

### Disastrous Explosion at Ardmore, Oklahoma

By the explosion of a tank car containing gasoline, standing on the track near the union station at Ardmore, Okla., on Monday last, 40 or more persons were killed and buildings were damaged to the extent of about \$500,000. Repairers were at work on the car and it is supposed that a spark caused by a workman's hammer ignited vapors which had escaped from the car, which was one of 250 barrels capacity. It is said that much of the damage was due to dynamite, in the freight house, exploded by the shock caused by the gasoline explosion. Most of the fatal injuries to persons appear to have occurred in frame buildings which fell. Burning liquid was thrown many hundred feet and fires were started in 20 buildings. About 200 persons were injured, many of them being rescued with much difficulty because of the great volume of smoke from fires. Included in the property destroyed were 30 freight cars in the yard of the Gulf, Colorado & Santa Fe.

### Traffic Club of New York

The regular meetings of the Traffic Club of New York will henceforth be held at the Waldorf-Astoria Hotel instead of at the Hotel Astor as formerly.

### Engineers' Society of Western Pennsylvania

The regular bimonthly meeting of the mechanical section of the Engineers' Society of Western Pennsylvania will be held in the society rooms in the Oliver building, Pittsburgh, on October 5. The subject of the meeting will be "Gas Welding and Cutting—A Symposium." Papers will be presented by C. K. Bryce, engineer of the Oxweld Acetylene Company, Newark, N. J., on "Use in Welding Heavy Parts"; by J. B. Henry, general superintendent of the Union Steel Casting Company, Pittsburgh, Pa., on "Use in Steel Foundries," and by A. F. Mitchell, assistant to superintendent of the armor plate department of the Carnegie Steel Company at Homestead on "Use in Steel Mills."

### Convention of National Association of Railway Commissioners

The twenty-seventh annual convention of the National Association of Railway Commissioners is to be held in San Francisco on October 12-16. A new feature of the convention this year is to be the allotment of 45 minutes at the beginning of each day's session for 5 or 10 minutes' discussion by each commission represented on the most important developments of the year relating to its work. This is to be a discussion of the methods of the work rather than the work accomplished. Judson C. Clements, of the Interstate Commerce Commission, and E. W. Bemis, of Chicago, are to address the association on matters pertaining to the work of the commissioners. A reception and banquet will be tendered the association by the Exposition Commission on Wednesday, October 13, at which addresses will be made by the governor and lieutenant-governor of California. Most of the time of the meetings is to be given up to the presentation and discussion of the various committee reports. The secretary of the association is William H. Connolly, 1319 Columbia road, Washington, D. C.



## MEETINGS AND CONVENTIONS

The following list gives names of secretaries, date of next or regular meetings, and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

- AIR BRAKE ASSOCIATION.**—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 2-5, 1916, Atlanta, Ga.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.**—F. A. Pontious, 455 Grand Central Station, Chicago. Annual meeting, July, 1916.
- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.**—H. C. Boardman, D. L. & W., Hoboken, N. J. Next meeting, October 21-23, 1915, Boston, Mass.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.**—R. O. Wells, Illinois Central, East St. Louis, Ill. Next meeting June 20-23, 1916, Cincinnati, O.
- AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.**—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Next meeting, October 26-27, 1915, French Lick Springs Hotel, French Lick Springs, Ind.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.**—E. H. Harman, Room 101, Union Station, St. Louis, Mo.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.**—E. B. Burritt, 8 W. 40th St., New York. Annual convention, October 4-8, 1915, San Francisco, Cal.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.**—H. G. McConaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.
- AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPEFITTERS' ASSOCIATION.**—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago.
- AMERICAN RAILWAY ASSOCIATION.**—W. F. Allen, 75 Church St., New York. Next meeting, November 17, 1915, Chicago.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.**—C. A. Lichty, C. & N. W., Chicago. Next convention, October 19-21, 1915, Detroit, Mich.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.**—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 21-23, 1916, Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.**—J. W. Taylor, 1112 Karpen Building, Chicago. Annual meeting, June, 1916.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.**—Owen D. Kinsey, Illinois Central, Chicago. Annual meeting, July, 1916.
- AMERICAN SOCIETY FOR TESTING MATERIALS.**—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.**—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.**—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 7-10, 1915, New York.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.**—F. J. Angier, Supt. Timber Preservation, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 18-20, 1916, Chicago.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.**—E. R. Woodson, Rooms 1116-8, Woodward Bldg., Washington, D. C. Annual meeting, June 28, 1916, Detroit, Mich.
- ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.**—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, 2d Tuesday in October, 1915, New York.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.**—Willis H. Failing, N. Y. C., 3842 Grand Central Terminal, New York. Next meeting, May 19, 1916, Atlantic City, N. J.
- ASSOCIATION OF RAILWAY ELECTRIC ENGINEERS.**—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual meeting, October 18-24, 1915, Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.**—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 20-22, 1916, St. Paul, Minn.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.**—G. P. Conard, 75 Church St., New York. Next meeting, December 14-15, 1915, St. Louis, Mo.
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.**—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.**—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.**—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.**—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.
- CENTRAL RAILWAY CLUB.**—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.**—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.
- FREIGHT CLAIM ASSOCIATION.**—Warren P. Taylor, Traffic Manager, R. E. & P., Richmond, Va. Annual session, May 17, 1916, Washington, D. C.
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.**—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.**—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May, 1916, Chicago.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.**—Wm. Hall, 1126 W. Broadway, Winona, Minn.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.**—A. L. Woodworth, C. H. & D., Lima, Ohio. Next meeting, August, 1916, Chicago.
- MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.**—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next meeting, October 19-21, 1915, St. Louis, Mo.
- MASTER BOILER MAKERS' ASSOCIATION.**—Harry D. Vought, 95 Liberty St., New York.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.**—A. P. Dane, B. & M., Reading, Mass. Next annual meeting September, 1916, Wilmington, Del.
- MASTER CAR BUILDERS' ASSOCIATION.**—J. W. Taylor, 1112 Karpen Building, Chicago. Annual meeting, June, 1916.
- NATIONAL RAILWAY APPLIANCE ASSOCIATION.**—C. W. Kelly, 349 People's Gas Bldg., Chicago. Next convention, March, 1916, Chicago.
- NEW ENGLAND RAILROAD CLUB.**—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.
- NEW YORK RAILROAD CLUB.**—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.
- NIAGARA FRONTIER CAR MEN'S ASSOCIATION.**—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.
- PEORIA ASSOCIATION OF RAILROAD OFFICERS.**—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.
- RAILROAD CLUB OF KANSAS CITY.**—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.
- RAILROAD MEN'S IMPROVEMENT SOCIETY.**—J. B. Curran, Erie R. R., 50 Church St., New York. Meetings, alternate Thursdays, October to May, Assembly Rooms of Trunk Line Association, 143 Liberty St., New York.
- RAILWAY BUSINESS ASSOCIATION.**—Frank W. Noxon, 30 Church St., New York. Annual meeting, December, 1915. Waldorf-Astoria Hotel, New York.
- RAILWAY CLUB OF PITTSBURGH.**—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.
- RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.**—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.
- RAILWAY FIRE PROTECTION ASSOCIATION.**—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Next meeting, October 5-7, 1915, Chicago.
- RAILWAY REAL ESTATE ASSOCIATION.**—Frank C. Irvine, 1125 Pennsylvania Station, Pittsburgh, Pa. Next meeting, October 13, 1915, Chicago.
- RAILWAY SIGNAL ASSOCIATION.**—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Next annual convention, September, 1916, Grand Hotel, Mackinac Island, Mich.
- RAILWAY STOREKEEPERS' ASSOCIATION.**—J. P. Murphy, N. Y. C. R. R., Box C, Collingwood, Ohio.
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.**—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders' and Master Mechanics' Associations.
- RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.**—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.
- RICHMOND RAILROAD CLUB.**—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.**—L. C. Ryan, C. & N. W., Sterling, Ill. Next annual convention, September 19-22, 1916, Chicago.
- ST. LOUIS RAILWAY CLUB.**—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.
- SALT LAKE TRANSPORTATION CLUB.**—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.
- SIGNAL APPLIANCE ASSOCIATION.**—F. W. Edmunds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.**—Carl Nyquist, C. R. I. & P., 1134 La Salle St. Sta., Chicago. Annual meeting, October 19-21, Colorado Springs, Colo.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.**—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Annual meeting, January, 1916.
- SOUTHERN & SOUTHWESTERN RAILWAY CLUB.**—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.
- TOLEDO TRANSPORTATION CLUB.**—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.
- TRACK SUPPLY ASSOCIATION.**—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.
- TRAFFIC CLUB OF CHICAGO.**—W. H. Wharton, La Salle Hotel, Chicago.
- TRAFFIC CLUB OF NEWARK.**—John J. Kautzmann, P. O. Box 238, Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washington, 559 Broad St., Newark.
- TRAFFIC CLUB OF NEW YORK.**—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.
- TRAFFIC CLUB OF PITTSBURGH.**—D. L. Wells, Gen'l Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings bi-monthly, Pittsburgh.
- TRAFFIC CLUB OF ST. LOUIS.**—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.
- TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.**—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 21, 1916, Toronto, Ont.
- TRANSPORTATION CLUB OF DETROIT.**—W. R. Hurley, Superintendent's office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.
- TRAVELING ENGINEERS' ASSOCIATION.**—W. O. Thompson, N. Y. C. R. R., East Buffalo, N. Y. Next meeting, September, 1916, Chicago.
- UTAH SOCIETY OF ENGINEERS.**—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.
- WESTERN CANADA RAILWAY CLUB.**—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.
- WESTERN RAILWAY CLUB.**—J. W. Taylor, 1112 Karpen Building, Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.
- WESTERN SOCIETY OF ENGINEERS.**—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.

## Traffic News

The "Oriental Limited" train of the Chicago, Burlington & Quincy and the Great Northern, running between Chicago and Seattle, Wash., has arrived at Seattle on time 507 times in 530 days. Most of the delays have been due to blasting in connection with tunnel construction in the Rocky mountains.

Governor Fielder, of New Jersey, has appointed a committee of 24 citizens—public officers and business men—to present to the Interstate Commerce Commission a formal complaint, alleging discrimination against New Jersey in freight rates from the North and West, referring especially to shipments destined to New York harbor.

The counties of La Salle, Bureau and Putnam, Illinois, have been quarantined against the foot-and-mouth disease by an order of the United States Department of Agriculture. This action is taken owing to the discovery of the disease in two herds of cattle in La Salle county. The Department has concentrated its field force of veterinarians and inspectors on suppressing the outbreak in Illinois. At present 71 federal veterinarians and 54 assistants are at work in and around the suspected territory, making farm to farm examinations, disposing of infected herds, disinfecting premises and arranging for local quarantines to prevent the spread of the disease from infected farms to their neighbors. Co-operating with the department force is a large force of Illinois state veterinarians and inspectors.

### Supplemental Hearing on Western Rate Advances

As mentioned in last week's issue, Examiner E. W. Hines, of the Interstate Commerce Commission, held a hearing in Chicago last week on advances in freight rates proposed by the railways in Western Trunk Line and Southwestern Tariff Committee territory on a number of commodities which were filed too late to be heard in connection with the Western rate advance case, and which have been suspended by the commission to December 29. It was announced on behalf of the carriers that the tariffs advancing rates on furniture would be withdrawn, pending conferences with the shippers, and that new tariffs would be filed at a later date. The principal advance under consideration was that on agricultural implements of two cents per 100 lb. throughout most of the territory, effected by advancing these articles to Class A. The principal testimony on these rates was given by E. B. Boyd, chairman of the Western Trunk Line Committee, who testified that at the present rates agricultural implements are not bearing their proper share of the burden of transportation. Additional testimony was given by W. A. Poteet, vice-chairman of the Western Trunk Line Committee, and testimony on behalf of the protesting shippers was given by C. T. Bradford, assistant traffic manager of the International Harvester Company. R. G. Brown, assistant general freight agent of the Chicago, Rock Island & Pacific, testified in behalf of the carriers regarding the proposed advance of one cent per 100 lb. in the rates on canned goods. In addition to representatives of commercial organizations and individual shippers, the state railway commissions of Iowa, Minnesota and Kansas were represented among the protestants.

**THE WATER POWER POSSIBILITIES OF RUSSIA.**—Without considering the Caucasus, the trans-Caspian region, or eastern Siberia, there are still in Russia proper great sources of hydraulic energy. In the northwest are the falls and rapids of various rivers, for example, the Volkhov with 30,000 to 50,000 horsepower, the Msta with 30,000, the Narova with 40,000 to 70,000, the eastern Duna with 120,000 and the Niemen. In the north again the Olonetz region offers a number of available power sites, as do the rivers which flow into the Arctic. In the Ural Mountains energy could be obtained from lakes and from the rivers Chusovaya and Bielaia, and on the Valdai plateau are sites for power development. In the south and southwest are the falls of the Dnieper, 120,000 to 200,000 horsepower, and the rapids of the Dniester and the central Bug.—*The Engineering Magazine.*

## Commission and Court News

### STATE COMMISSIONS

The Illinois Public Utilities Commission has again suspended the tariffs providing for an increase of 5 per cent in freight rates in the state, filed by the railroads after the Interstate Commerce Commission had allowed a similar advance on interstate rates. The rates have now been suspended until December 15.

At the hearing before the Texas Railroad Commission last week on the application of the railroads of the state for authority to increase intrastate freight rates by 15 per cent, attorneys for the commission made a motion that the commission reserve its decision in the case until the railroads have filed complete answers to all the questions propounded during the hearing on which the commission ordered the roads to furnish the desired information.

The Montana Railroad Commission, acting on the complaint of the Polleys Lumber Company, of Missoula, has ordered reductions in the rates for the transportation of lumber to the principal points in the state, the reductions varying from 10 to 15 per cent. Complainants averred that their business in lumber, all of low grade, suffered from the competition of dealers on the Pacific coast, who make large quantities of high grade lumber and can afford to sell their low grade product at any price that can be obtained. The chairman of the commission, J. H. Hall, dissented from the opinion of the majority, holding that larger reductions should have been made. He would require that the rates on lumber in carloads should never exceed 8.39 mills per ton mile, which is said to be the average received from all lumber carried by the Northern Pacific.

Representatives of various organizations of shippers in Illinois held a conference with the Illinois Public Utilities Commission on September 21, for the purpose of discussing what action the commission should take in reference to a complaint filed by the Business Men's League of St. Louis with the Interstate Commerce Commission, alleging that freight and passenger rates from St. Louis to Illinois points are discriminatory as compared with the rates in effect from Illinois points to East St. Louis, which were not advanced at the time the interstate rates were advanced by order of the Interstate Commerce Commission in the 5 per cent rate case.

The Public Service Commission, of Missouri, has dismissed the complaint of the firemen's brotherhood against the principal railroads in that state asking the commission to order the equipment of switching engines with headlights, on both ends, of sufficient power to enable the engineman to see a box car 400 ft. away. The commission is enjoined by statute to require safe and adequate facilities, but it holds that in this matter the state law is superseded by congressional action, and therefore is of no effect. In the work done by switching engines the separation of interstate traffic from intrastate is impracticable, and, Congress having taken action, the jurisdiction of the state commission is nullified. Reference is had particularly to the act of March 4, 1915, by which Congress, in legislating concerning inspection of locomotives by federal authority, took jurisdiction over the entire locomotive and tender and all parts and appurtenances thereof.

### Steam and Electric Roads Must Be Friendly

In an opinion by Commissioner Hodson, the New York State Public Service Commission, Second District, has ordered the New York Central and the International [Electric] Railway to provide facilities for the switching of freight between the two roads at Lockport, and to agree on a reasonable switching tariff. This is the oldest case before the commission, having been filed in 1908. Commissioner Hodson says that the long delay is due to the fact that a number of similar cases were pending in the courts and commissions of other states, and that a case parallel to this has only recently been decided by the United States Supreme Court. He says that the carriers



themselves should have adjusted the problem long ago. The decision holds that the present service is unreasonably inadequate, inconvenient and expensive, as well as possibly discriminatory, and that neither the law nor an order to enforce it will be confiscatory, following the just rendered decision of the United States Supreme Court in a Michigan case. The Erie Railroad and the International, which uses the line of the Erie into Lockport, alleged that it was a condition of the lease between the two that no road other than the Erie should participate in freight originating on its line leased to the International.

The opinion shows that when a car of freight arrives in Lockport on one road, consigned to a plant on the other road, the consignee must either unload and haul the contents across the city in a wagon, or must allow the car to be hauled 14 miles back to North Tonawanda, there switched to the other road and hauled 14 miles again to his plant, subjecting him not only to this delay, but to a switching charge of upward of \$30. There are several places in both the upper and lower parts of Lockport where these two railroads could be joined by a switch, and where there are ample opportunities to have sufficient storage tracks to hold all the cars which might be placed there at any one time for delivery from one road to the other. The city and the commercial bodies stand pledged to assist the railroads in the acquirement of necessary private property. There are plants in Lockport contiguous to both roads, and the steam locomotives of the New York Central and the electric engines of the International haul cars over the same tracks to and from these plants.

Commissioner Hodson says:

"The underlying theory of the roads seems to be the maintenance of competition, while the complainants seek to invoke the more modern theory of regulation. \* \* \* Both carriers seem to forget that they have no prescriptive right to the freight business at Lockport." \* \* \* The clause in the International-Erie lease confining the International switching to Erie business is qualified by the phrase "unless required by law to do so," and Commissioner Hodson says that the time has arrived when the law should require such special switching service to be extended and made general in accordance with the demand of the complainants.

## COURT NEWS

The recent decision of the Missouri Public Service Commission, awarding a certificate of public necessity and convenience to the Kansas City Connecting Railroad, and authorizing the company to construct and operate a terminal and eight miles of tracks on the Missouri side of the Kansas City Stock Yards, was sustained in a decision on September 21 by the Cole County Circuit Court at Jefferson City, Mo. The trunk line railroads which had appealed from the order of the commission filed notice that they would appeal from the decision to the state Supreme Court.

### "Engaged in Interstate Commerce"

The Circuit Court of Appeals, Fifth circuit, holds that an employee, while cleaning stencils used by the company to mark cars owned and used by it in interstate commerce, was not engaged in interstate commerce within the act.—*Illinois Central v. Rogers*, C. C. A., 221 Fed. 52.

The Pennsylvania Supreme Court holds that an employee was "engaged in interstate commerce" when he was injured from being struck by a passenger train while he was waiting for a freight train to pass over another track on which he was bonding together rails with copper wires, where the tracks were used in interstate commerce.—*Glunt v. Pennsylvania* (Pa.), 95 Atl. 109.

### Repair Shop Employees—Fellow-Servant Rule

A car repairer was injured by a heavy casting which fell on him from the top of a cab when the engine was passing from the roundhouse. The Michigan Supreme Court held that the injury was due to no failure of the railroad to furnish a safe place to work, but to the negligence of the fellow-servant operating the locomotive, for which the railroad was not liable. The Michigan act abrogating the common-law fellow-servant rule as

applied to railroad employees expressly excepts employees working in shops or offices, and the plaintiff was within this exception.—*Revolinski v. Manistee & N. E.* (Mich.), 152 N. W. 941.

### Recovery for Loss of Profits—Notice as to Use

A cotton gin was delayed in transit and recovery was sought for loss of business caused by the delay. The Alabama Court of Appeals held that notice of the particular use to which the gin was to be put could not be implied merely from the circumstances of the shipment, being in the ginning season, so as to authorize recovery. There were many uses to which the gin could be put other than operation for profit. It might have been bought to resell, or to lease, or ordered for a customer, or for demonstration, and the like.—*Illinois Central v. Brothers* (Ala.), 67 So. 628.

### Intrastate Shipments—Division of Rates

The Texas Court of Civil Appeals holds that the Railroad Commission, under the statute authorizing the commission to fix the pro rata part of charges received by each of two or more connecting carriers and to establish joint rates, etc., has authority to order a division of revenue accruing to connecting carriers under freight rates on coal not belonging to either carrier. But it also holds that on an intrastate shipment a carrier is not entitled to the benefit of a joint rate on its own line for carrying its own property, in the absence of contract therefor; and an order of the Railroad Commission, which permits a carrier to charge freight rates for hauling its own property over its own road, and to participate in a through rate for so doing, permits an unjust discrimination, in violation of the statute.—*Rio Grande & Eagle Pass v. Railroad Commission* (Tex.), 175 S. W. 1116.

### Fireman's Contributory Negligence Diminishing Damages

Action was brought under the federal employers' liability act against a railroad by a fireman for injuries caused by his engineering disregarding stop signals, and running into a train. There was clear evidence showing negligence by the engineer. The substantial question was as to the effect of the fireman's conduct. He saw the green signal requiring the train to slacken speed and called it to the engineer, but, when it became evident that the engineer was paying no attention to the caution, the fireman did nothing further to insure that the signal be obeyed. The Circuit Court of Appeals, Sixth circuit, held that he was guilty of contributory negligence, diminishing his damages, as provided by the statute. His inaction was not excusable because of his supposition that the signal had been changed to a white signal before they passed it; this supposition being based on nothing except the fact that the engineer failed to slacken.—*Pennsylvania v. Sheeley* (C. C. A.), 221 Fed. 901.

### The New York "Jitney" Law

The New York Supreme Court, Justice Hasbrouck, considering the so-called "jitney bus" law, holds that the following classes of vehicles must secure the consent of local authorities and apply to the Public Service Commission for a certificate of public convenience and necessity, namely: (a) A bus line; (b) a stage route; (c) a motor vehicle line or route; (d) a vehicle in connection with a bus line, a stage route, a motor vehicle line or route; (e) a vehicle carrying passengers at a rate of fare of fifteen cents or less for each passenger within the limits of a city; (f) a vehicle carrying passengers in competition with another common carrier which is required by law to obtain the consent of the local authorities of said city to operate over the streets thereof.

Practically all operators of bus lines in the cities of the state are liable to procedure under the penalty clause of the Public Service Commissions Law unless they secure the permission of the city authorities and the certificate of the Public Service Commission. It is held that in the case of Elmer G. Booth, of Rochester, the license of the city of Rochester, granted before this law took effect, does not relieve Booth from the necessity of getting the consents of the city authorities under the new law and of the Public Service Commission.

## Railway Officers

### Executive, Financial, Legal and Accounting

S. H. Reams, agent of the Seaboard Air Line at Savannah, Ga., has been elected vice-president of the Durham & Southern, with headquarters at Durham, N. C., vice J. E. Stagg, deceased.

C. E. Schaff, president of the Missouri, Kansas & Texas, and of the Missouri, Kansas & Texas Railway of Texas, with office at St. Louis, Mo., has been appointed receiver of both companies.

O. G. Parsley, vice-president of the Missouri, Oklahoma & Gulf of Texas, has removed his offices from Kansas City, Mo., to Ft. Worth, Tex., where he has assumed charge of traffic and operation in Texas.

H. U. Mudge, president and co-receiver of the Chicago, Rock Island & Pacific, has resigned as receiver and has been appointed by Jacob M. Dickinson, the sole remaining receiver, chief executive officer for the receiver. See an item in Financial News under Chicago, Rock Island & Pacific.

### Operating

J. E. Votaw has been appointed assistant general manager of the Memphis, Dallas & Gulf, with headquarters at Nashville, Ark.

E. Lambert has been appointed trainmaster of the New York Central, with headquarters at Syracuse, N. Y., and W. E. Nelson has been appointed trainmaster, with headquarters at Lyons, N. Y.

Robert King, division superintendent of the Canadian Pacific at London, Ont., has been appointed division superintendent of the National Transcontinental, with headquarters at Winnipeg, Man.

A. E. Pistole, superintendent of terminals of the Texas & Pacific at Ft. Worth, Texas, has been appointed trainmaster of the Ft. Worth subdivision of the Rio Grande division, with headquarters at Baird, Texas.

J. K. Yohe, Jr., trainmaster of the Baltimore & Ohio at Connellsville, Pa., has been appointed assistant superintendent, with headquarters at Cumberland, Md., and C. M. Stone, assistant trainmaster at Smithfield, Pa., has been appointed trainmaster, with office at Connellsville.

John T. Broderick, chief clerk to the third vice-president of the Baltimore & Ohio at Baltimore, Md., has been promoted to supervisor of special bureaus of the operating department, in charge of the safety first department, agreements and contracts, records and reports of federal and state commissions, free transportation and the employees' magazine.

M. Seargeant, inspector of transportation of the Louisville & Nashville at Jackson, Ky., has been appointed superintendent of the Eastern Kentucky division and J. R. Pates has been appointed master of trains. The Eastern Kentucky division includes the Louisville & Atlantic Railroad and that part of the Lexington & Eastern Railway from Maloney to McRoberts, Ky. Division headquarters are at Ravenna, Ky. The rest of the Lexington & Eastern from Lexington to Maloney will be the Lexington & Eastern branch, and will be added to the Kentucky division of the Louisville & Nashville.

### Traffic

N. C. Spangler, division freight agent of the Baltimore & Ohio, at Chillicothe, Ohio, has resigned to go into other business.

A. A. Boyle has been appointed commercial agent of the Missouri & North Arkansas, with headquarters at Birmingham, Ala.

C. J. Chisam, assistant general freight agent of the Chicago Great Western at Omaha, Neb., has been appointed general agent, with office at Los Angeles, Cal., vice M. F. Collins, resigned.

J. S. Houston, assistant general freight agent of the International & Great Northern, with headquarters at St. Louis, Mo., has been promoted to assistant general freight and passenger

agent, with headquarters at St. Louis and Chicago. Effective October 1.

David H. Hilton has been appointed general eastern agent of the Chicago, Indianapolis & Louisville, with headquarters at New York.

L. C. Finkle, has been appointed commercial agent of the Atlantic Coast Line, with office at Cincinnati, Ohio, vice E. H. Smith, resigned.

L. Osborn has been appointed division freight agent of the Chicago, Rock Island & Pacific, with headquarters at Hutchinson, Kan., vice J. B. Rishel, deceased. Effective October 1.

A. C. Littlejohn, traveling freight agent of the Queen & Crescent Despatch, has been appointed commercial agent, with headquarters in New Orleans, La., vice A. B. Collins, transferred.

Edgar Yungman, division passenger agent of the Pennsylvania Railroad, at Pittsburgh, Pa., has been appointed assistant general passenger agent with headquarters at Philadelphia, succeeding

Colin Studds, deceased. Mr. Yungman was born on August 24, 1867, at Tamaqua, Pa., and was educated in the public schools of Camden, N. J. He entered the service of the Pennsylvania Railroad on August 14, 1883, as a clerk in the passenger department at Philadelphia, Pa., and after serving in various positions in that department was made passenger agent of the Baltimore district at Baltimore, Md., in October, 1902. The following year he was transferred to the Southeastern district at Washington, D. C., and later in the same year was appointed chief clerk of the passenger



E. Yungman

department at Philadelphia. In December, 1907, he was appointed division ticket agent of the Philadelphia & Erie division and the Northern Central Railway at Williamsport, Pa., and in April, 1910, was transferred to Pittsburgh as division ticket agent of the Western Pennsylvania and Allegheny divisions. In March, 1913, when the passenger department of the Pennsylvania Lines East of Pittsburgh and Erie was reorganized, Mr. Yungman was promoted to division passenger agent at Pittsburgh, which position he held at the time of his recent appointment as assistant general passenger agent of the same road as above noted.

F. W. Robinson, assistant traffic manager of the Oregon-Washington Railroad & Navigation Company, has been appointed traffic manager at Portland, Ore., to succeed R. B. Miller, resigned. Effective November 1.

Al J. Hirschman, traveling freight agent of the St. Louis Southwestern of Texas, has been appointed general traveling agent with headquarters at Ft. Worth, Tex., vice Claude Wilson, resigned. Effective September 10.

R. E. Larmour, assistant general freight agent of the Canadian Pacific at Vancouver, B. C., has been appointed general agent of the freight department, with office at New York, succeeding W. F. Stevenson, deceased.

M. W. Burns has been appointed general southwestern agent of the Chicago & Eastern Illinois, with headquarters at Chicago, Ill. George H. Hume has been appointed commercial agent, with headquarters in Chicago, vice M. W. Burns, promoted. Effective September 20.

E. L. Goff, division freight agent of the Chicago, Rock Island & Pacific, with headquarters at Davenport, Iowa, will assume the duties of S. F. Boyd, district freight and passenger agent in Davenport, on October 1. Mr. Goff's title will be divi-



sion freight and passenger agent. Mr. Boyd, who has been in the employ of the Rock Island for about 35 years, has been retired on a pension, and his jurisdiction, extending over Davenport, Iowa, Moline and Rock Island, Ill., has been added to that of Mr. Goff.

J. W. Daniel, J. M. Hansell and J. S. Smith have been appointed commercial agents of the Missouri, Oklahoma & Gulf of Texas, with headquarters at Houston, Sherman and Ft. Worth, Texas, respectively. Effective September 1. H. W. Ross, general freight and passenger agent, with headquarters at Denison, Tex., has resigned.

#### Engineering and Rolling Stock

William Henry Haley, whose appointment as superintendent of car service of the Missouri Pacific—St. Louis, Iron Mountain & Southern was announced last week, was born on July 27,



W. H. Haley

1872, at Dundee, Mo. After a grammar school education he entered railway service as messenger boy for the Terminal Railroad Association of St. Louis on August 15, 1888. He held consecutively the positions of yard clerk and car accountant for the same association and on January 10, 1901, was appointed general yard clerk of the Missouri Pacific at St. Louis, Mo., a position which he held until October 1, 1904. From that date until June 16, 1905, he held the same position for the Missouri Pacific and the St. Louis, Iron Mountain & Southern; from June, 1905, until June 1, 1907,

he was car clerk of the St. Louis terminal division of the same roads; from June, 1907, to May 8, 1912, freight distributor of these railroads. Up to the time of his recent appointment as superintendent of car service, noted above, he was superintendent of the American Refrigerator Transit Company at St. Louis.

Ralph L. Chandler, whose appointment as district master car builder of the New York Central, with headquarters at East Buffalo, N. Y., has already been announced in these columns,



R. L. Chandler

was born on June 4, 1875, at Milford, N. Y., and was educated in the public and high schools of Buffalo, N. Y. He began railway work on June 28, 1891, with the New York Central & Hudson River and served as machinist's apprentice until October, 1894. He was then to December of the following year a machine hand in the mill of the Pullman Company at Buffalo. From January, 1896, to September, 1897, he was car builder with the American Car & Foundry Company, at Buffalo, and then re-entered the service of the New York Central & Hudson River as car

repairer. He was promoted to foreman in January, 1898, becoming assistant general foreman in September, 1900, and three years later was appointed piece work foreman on the western

division. In January, 1911, he was appointed superintendent of shops at East Buffalo, and the following August was made division general foreman of the Pennsylvania division of the same road. On October 22, 1912, he was promoted to supervisor of piece work, covering the car and locomotive departments, which position he held at the time of his recent appointment as district master car builder of the New York Central, with headquarters at the East Buffalo, N. Y., car shops, as above noted.

William Victor Wicks has been promoted from locomotive engineer of the Northern Pacific to the position of road foreman of engines.

W. B. Wood has been appointed acting assistant superintendent of shops of the Chicago, Rock Island & Pacific at Silvis, Ill., vice P. Linthicum, promoted.

Grant W. Lillie, who resigned recently as mechanical superintendent of the Second district of the Chicago, Rock Island & Pacific, at Topeka, Kan., has been appointed master mechanic of the Bingham & Garfield. His headquarters will be at Magna, Utah.

A. J. Mayham, master mechanic of the Spokane & Inland Empire, with headquarters at Spokane, Wash., has resigned, and D. I. Clough, master mechanic of the Oregon Electric and the United Railways, at Portland, Ore., has had his jurisdiction extended to include that of Mr. Mayham.

H. S. Hills has been appointed master mechanic of the Eastern Kentucky division of the Louisville & Nashville, and J. O. Ely, roadmaster of the Lexington & Eastern at Jackson, Ky., has been appointed roadmaster of the Eastern Kentucky division of the Louisville & Nashville. See item in Operating Officers.

#### Purchasing

W. L. Peabody, storekeeper of the Lake Superior division of the Northern Pacific, with headquarters at Duluth, Minn., has been appointed storekeeper of the St. Paul division, with office at Mississippi street, St. Paul, Minn. G. C. Harpke has been appointed storekeeper of the Lake Superior division to succeed W. L. Peabody, transferred.

#### OBITUARY

Rudolph Ellis, a director of the Pennsylvania Railroad, died on September 22, at his home at Bryn Mawr, Pa., at the age of 78.

John T. Johnson, general superintendent of the Central of Georgia at Savannah, Ga., died in that city on September 21. He was born in December, 1862, in Hanover county, Va., and began railway work in 1879 as a brakeman on the Chesapeake & Ohio. Subsequently he served as conductor on the same road. Since 1886 he had been in the continuous service of the Central of Georgia, serving consecutively as conductor, yardmaster and trainmaster until 1898, when he was appointed superintendent. From 1903 to January, 1905, he was superintendent of transportation; then was appointed general superintendent of transportation, and since 1906 was general superintendent.

Frank A. Durban, general attorney of the Baltimore & Ohio in the states of Ohio and Indiana, with headquarters at Zanesville, Ohio, died, as has been previously noted, in an official car on a Baltimore & Ohio train, near Cumberland, Md., on September 8, while returning to his home from Atlantic City, where he had gone for his health. Mr. Durban was born in Zanesville on November 10, 1859, and was educated in the public schools of that city and at the University of Michigan, where he completed the law course in 1879. In May, 1891, he became local counsel for the Baltimore & Ohio and later general counsel of the Zanesville & Ohio River, now the Little Kanawha division of the B. & O., and local attorney for the Cincinnati & Muskingum Valley, and for the Zanesville Street Railway. He became solicitor for the Cincinnati & Muskingum Valley in 1904 and continued in that capacity after it was absorbed by the Pennsylvania. In January, 1904, he succeeded J. H. Collins as division counsel for the B. & O. and on July 1, 1909, became general attorney for Indiana and Ohio. He also held various offices of responsibility with subsidiary roads and had served as president of the Zanesville & Ohio, the Detroit, Toledo & Ironton, and the Ann Arbor.

## Equipment and Supplies

### LOCOMOTIVE BUILDING

THE NORFOLK & WESTERN is in the market for 10 Mountain type locomotives.

THE CHICAGO JUNCTION is in the market for 10 six-wheel switching locomotives.

THE MINNEAPOLIS & ST. LOUIS is in the market for 15 Santa Fe type locomotives.

THE PHILADELPHIA & READING has ordered 20 Mikado type locomotives from the Baldwin Locomotive Works.

THE PUBLIC BELT RAILROAD OF NEW ORLEANS has ordered 5 switching locomotives from the Baldwin Locomotive Works.

THE CINCINNATI, INDIANAPOLIS & WESTERN is in the market for 48 locomotives, including a number of Mikado type, Pacific type and switching locomotives.

THE RUSSIAN GOVERNMENT is said to be contemplating the purchase of 150 locomotives in addition to the 400 now being built by the Baldwin Locomotive Works, the American Locomotive Company and the Canadian Locomotive Corporation.

THE CUPEY SUGAR COMPANY has ordered one four-wheel saddle tank locomotive from the American Locomotive Company for export to Cuba. This locomotive will have 11 by 16 in. cylinders, 33-in. driving wheels and a total weight in working order of 39,000 lb.

THE PUNTA ALEGRA SUGAR COMPANY has ordered one four-wheel saddle tank locomotive and two Mogul type locomotives from the American Locomotive Company for export to Cuba. The saddle tank locomotive will have 11 by 16 in. cylinders, 33-in. driving wheels and a total weight in working order of 39,000 lb., and the Mogul type locomotives will have 12 by 18 in. cylinders, 34½-in. driving wheels and a total weight in working order of 50,000 lb.

### CAR BUILDING

THE COPPER RANGE is in the market for 40 ore cars.

THE MICHIGAN ALKALI COMPANY is inquiring for prices on 30 hopper cars.

THE NEW YORK, NEW HAVEN & HARTFORD is in the market for 2 dining cars.

THE PHILADELPHIA & READING has issued inquiries for 1,000 gondola or hopper cars.

THE SAN PEDRO, LOS ANGELES & SALT LAKE has ordered 5 caboose cars from the Pullman Company.

THE CENTRAL OF NEW JERSEY has ordered 25 coaches and 5 baggage cars from Harlan & Hollingsworth Corporation.

THE LA BELLE IRON WORKS, Steubenville, Ohio, has ordered 5 30-ft. 200,000-lb. capacity flat cars from the Ralston Steel Car Company.

THE BALTIMORE & OHIO has given the Western Steel Car & Foundry Company an order to repair 250 box cars and the Ryan Car Company an order to repair 500 box cars.

THE CENTRAL OF GEORGIA, reported in last week's issue as inquiring for 5 passenger cars, is in the market for 1 baggage and mail car and 4 baggage and express cars.

THE WESTERN MARYLAND has ordered 200 automobile cars from the Western Steel Car & Foundry Company and 650 70-ton gondola cars from the Standard Steel Car Company.

THE MINNEAPOLIS & ST. LOUIS, reported in the *Railway Age Gazette*, of September 17, as being in the market for 100 box cars, is now said to have increased its inquiry to 1,000 cars.

THE CHICAGO & NORTH WESTERN, reported in the *Railway Age Gazette* of September 17 as being in the market for 500 ore

cars, has ordered these cars from the American Car & Foundry Company.

THE DELAWARE & HUDSON has ordered 9 72-ft. all steel passenger coaches with smoking compartments, and 6 60-ft. all steel baggage cars from the American Car & Foundry Company, and 9 72-ft. all steel passenger coaches with smoking compartments from the Barney & Smith Car Company.

### IRON AND STEEL

THE ERIE has ordered 20,000 tons of rails from the Illinois Steel Company.

THE WHEELING & LAKE ERIE has ordered 21,000 tons of rails from the Illinois Steel Company.

THE PERE MARQUETTE has ordered 17,000 tons of rails from the Algoma Steel Corporation.

THE SEABOARD AIR LINE has ordered 7,000 tons of rails from the United States Steel Corporation.

THE CHICAGO, BURLINGTON & QUINCY has ordered 18,000 tons of rails from the Illinois Steel Company.

THE WESTERN MARYLAND has ordered 500 tons of bridge material from the Fort Pitt Bridge Works.

THE BALTIMORE & OHIO has ordered 600 tons of structural material from the American Bridge Company for a new freight station at Pittsburgh.

THE NEW YORK CENTRAL has ordered 55,000 tons of rails from the Illinois Steel Company, 55,000 tons from the Lackawanna Steel Company and 10,000 tons from the Cambria Steel Company for 1916 delivery.

THE CHICAGO & NORTH WESTERN has ordered 600 tons of steel from the American Bridge Company for a record and office building.

THE PENNSYLVANIA has ordered 810 tons of steel from the American Bridge Company for a coal-handling plant, to be built at Baltimore, Md., and has ordered 400 tons of arch steel centers from the Phoenix Bridge Company for the bridge to be erected at Manayunk, Pa.

### MACHINERY AND TOOLS

THE PENNSYLVANIA RAILROAD is in the market for some punching and shearing machinery and a 40-ton gantry crane for the Altoona shops.

THE PENNSYLVANIA EQUIPMENT COMPANY is in the market for a second-hand turntable, 50 ft. long, with a capacity of 40 or 50 tons or heavier.

### SIGNALING

THE LOUISVILLE & NASHVILLE has authorized the installation of automatic block signals on the line between La Follette, Ky., and Etowah, 113 miles. It is estimated that the cost will be \$178,000.

CONSULAR REGULATIONS OF FOREIGN COUNTRIES (Canada and Latin America).—This is the title of tariff series No. 24, recently issued by the Bureau of Foreign and Domestic Commerce. The pamphlet contains a complete description of the shipping documents required in all Latin-American countries and Canada, gives facsimiles of consular invoices used in such countries, and points out such peculiar features as may be overlooked by the average exporter. The material has been compiled with great care, the chapter for each country having been submitted for revision to the consular representative of that country in the United States. Some American banking institutions and commission houses have also been consulted, and it is believed that by using this publication the average exporter will be able to prepare his shipping documents in correct form and save his customer in Latin-America from fines and delays in the delivery of his goods. The bulletin contains 66 pages and may be obtained from the Superintendent of Documents, Washington, D. C., for 10 cents a copy.



## Supply Trade News

The Algoma Steel Corporation, Ltd., will install additional open-hearth furnaces at the Sault Ste. Marie plant.

After a four months' test the Schroeder Headlight Company has received an order for its headlights from the Baltimore & Ohio Southwestern.

The Pratt & Whitney Company, New York, has moved its Chicago sales office to the Sharples building on Washington boulevard and Jefferson street.

Fairbanks, Morse & Co. have received a contract from the New York, Ontario & Western for a conveyor-type coaling station of large capacity to be erected at Utica, N. Y.

The Franklin Railway Supply Company, New York, has opened an office in the Transportation building, Montreal, Canada, in charge of J. S. Coffin, Jr., Canadian sales manager.

The Loco Light Company, Indianapolis, Ind., has been incorporated for the manufacture of headlights, with a capital of \$10,000, and directors, R. H. Pyle, L. J. Isbell, G. D. Thornton.

W. E. Hardy, who has been in charge of the sales of the mechanical rubber goods division of the Diamond Rubber Company and the B. F. Goodrich Company, has been appointed sales manager of the Boston Belting Company, Boston, Mass.

The Q & C Company, New York, has secured exclusive control of the Peffer air brake hose protector, which was previously sold by the Railway Economy Device Company, Chicago. This device will henceforth be known as the Q & C-Peffer hose protector.

T. W. Weaver, director of purchases of the Power & Mining Machinery Company, Cudahy, Wis., has become associated with L. E. Meidinger in the management of the Milwaukee office of A. M. Castle & Co., Chicago, and George M. Rider, formerly in the iron and steel brokerage business in Kansas City, has been placed in charge of the company's office at Kansas City.

Roland L. Taylor, a member of the firm of William A. Read & Co., New York, has completed negotiations for the purchase of the Midvale Steel Company, Nicetown, Philadelphia, Pa., for a syndicate headed by William Ellis Corey, at one time president of the United States Steel Corporation. Charles J. Harrah, the founder of the company and its president for 28 years, has resigned from his position as president and director, and Charles B. Dunn and Howard Sellers have also resigned as directors. James F. Sullivan, the vice-president, has resigned, and has been succeeded by W. P. Barba, the present general manager. The vacancies in the board will be filled by the election of William E. Corey, Percy A. Rockefeller and Samuel F. Pryor. Mr. Pryor is also a director of the Baldwin Locomotive Works. Joseph Entwistle, a stenographer, is at present in the position of president, but William E. Corey will be elected president shortly. The Midvale Steel Company is engaged in the manufacture of axles, wheels, steel parts, forgings, etc. It is also well equipped to supply cannon, armor plate and other munitions of war, but has done but little in that line during the present war. It is expected that it will immediately secure a number of large orders for munitions. It is also rumored that the Midvale Steel Company may be but one of a number of companies which will be secured by the same interests.

The du Pont powder interests have made a large investment in shares of the Baldwin Locomotive Works. It has been reported that they have secured enough of the stock to give them control, but Pierre S. du Pont, the president of the du Pont de Nemours Company, has refused either to confirm or deny the report. The Baldwin Locomotive Works has been a corporation in its present form only since June 7, 1911. At that time it acquired the property of Baldwin Locomotive Works, incorporated June 7, 1909, to take over the entire property of Burnham, Williams & Co., which had been operating the business known as Baldwin Locomotive Works, founded in 1831, by Matthias Baldwin. The company's present outstanding capital stock totals \$40,000,000, of which \$20,000,000 is common, and \$20,000,000 7 per cent cumulative preferred, having equal and full voting

power with the common stock. The Baldwin Locomotive Works is said to be working on war orders, having an aggregate value of \$140,000,000. Some details of these orders were given in the *Railway Age Gazette* of September 17, page 546. The Baldwin Locomotive Works may, as defined by its charter, manufacture only locomotives, trucks, railway and industrial equipment and parts thereof, castings and forgings, and engage in the sale of articles manufactured by it. For that reason it has established the Eddystone Munitions Company for the purpose of taking care of its orders for munitions, but it is understood that it will soon obtain a new charter which will give it the right to manufacture munitions of war itself.

## TRADE PUBLICATIONS

**WATER TUBE BOILERS.**—The A. D. Granger Company, New York, has issued Bulletin No. 2 describing and illustrating the company's Oswego internally fired water tube boilers.

**SCREW-CUTTING TOOLS.**—The Wells Brothers Company Division of the Greenfield Tap & Die Corporation, Greenfield, Mass., has recently issued catalog 34 relative to the company's line of screw-cutting tools and machinery. The booklet contains a large number of new devices and improvements on old ones, and, like its predecessors, stands in the front rank as a reference book in this line.

**CHAIN DRIVES.**—Publication No. 14, recently issued by the Morse Chain Company, Ithaca, N. Y., bears the appropriate title: "A Chain of Evidence." The booklet deals in particular with large power drives. It explains the advantages of silent chain drives and touches upon the superiority of Morse silent chain, mentioning among other things the economies secured through the use of the Morse rocker-joint which differentiates Morse chain from that of other makes. The catalog contains a number of interesting illustrations, including views of the largest chain drive in the world, a 5,000 h.p. Morse drive in the Ox Bow Hydro-Electric Plant, Snake River, Copperfield, Ore., and of the chain drive installation on the 300 h.p. McKee gasoline switching locomotive built for the Motley County Railway which was described in the *Railway Age Gazette* of January 15, 1915, page 101.

**LOCOMOTIVES.**—The Baldwin Locomotive Works has recently issued Record No. 81, describing and illustrating the triple articulated or Triplex locomotive recently built by that company for the Erie, and Bulletin No. 82, showing a number of views of Baldwin locomotives for export. The former booklet contains a detailed description of the Matt H. Shay, as the locomotive has been named, well illustrated by halftone views of the locomotive and various of its parts and line drawings showing the side elevation and cross sections. There are a number of pages dealing also with the Erie's Santa Fe type locomotive. The booklet dealing with locomotives for export contains views of a number of locomotives supplied on recent orders. The introduction touches upon the favorable position of the company as to export business and contains the interesting statement that the Baldwin Locomotive Works has been exporting locomotives since 1838, when two engines were shipped to Cuba. The illustrations given include views of the Pacific type locomotive built for New Zealand, the Pechot type locomotive built for the French government, the Mallet type engine built for the Archangel railway of Russia and a number of others.

**ENGLISH RAILWAYS AND THE GOLD SUPPLY.**—In furtherance of the desire expressed by the Chancellor of the Exchequer that the postoffice and all public departments charged with the duty of making cash payments shall use notes instead of gold coins wherever possible, and that the public shall co-operate in this policy, we understand that the railway companies are issuing instructions to all passenger stations, goods depots and offices in charge of the receipt of moneys to pay all gold received from the public into the banks instead of returning it into circulation. By these means railway booking and receiving offices will fall into line with the postoffices in the conservation of the gold supply of the country, whilst economy will further result by the discontinuance of the use of gold as a medium for the payment of wages to railway employees.—*Railway Gazette, London.*

## Railway Construction

**ABERDEEN RAILROAD (ELECTRIC).**—Incorporated in South Dakota to construct an electric railway and capitalized at \$250,000. Incorporators: S. C. Hedger, Charles A. Howard, Charles N. Harris.

**CHESAPEAKE & OHIO.**—Under the name of the Pond Fork Railway, plans have been made to build a line up Pond Fork of Coal river in Boone county, W. Va., to the head of Pond Fork, about 20 miles. The principal commodities the new line will carry are lumber and coal. (See Pond Fork Railway, Sept. 17, p. 547.)

**CHICAGO, MILWAUKEE & ST. PAUL.**—The report of this company for the year ended June 30, 1915, shows that the Seattle, Port Angeles & Western has under construction a line from Fairmount, Jefferson county, Washington, west via Port Angeles to Earles in Clallam county, 62 miles. The section of this line west of Port Angeles, about 24 miles, has been completed and was put in operation in January, 1915. The construction of second main track and grade reduction work on the Chicago & Council Bluffs division, in Iowa, was completed in June, 1915, between Green Island and Manilla, 270 miles. The work which was temporarily suspended on the Hastings & Dakota division has been resumed and 178.70 miles was finished and put in operation in June, 1915. New sections of second main track were completed and placed in operation on the Chicago & Council Bluffs division, from one mile east of Delmar, Iowa, to Lost Nation, 12.80 miles; Elberon to Capron, 40.46 miles; Coon Rapids to Manilla, 31.90 miles, a total of 85.16 miles, and on the Hastings & Dakota division, from Hopkins, Minn., to Cologne, 23.87 miles; Minnesota Falls to Great Northern tower, 5.80 miles; west of Montevideo, to double track switch, 10.09 miles, a total of 39.76 miles. The work of depressing the tracks from Hiawatha avenue to Hennepin avenue, in Minneapolis, Minn., about three miles, was delayed during the past year. It includes the elimination of 37 grade crossings. About 64 per cent of the work has been finished and the company plans to complete all this work during the season of 1916. Work on the elevation of the tracks along Bloomingdale road, in Chicago, 2.4 miles, is finished on about 95 per cent. This work includes the elimination of 35 grade crossings. The elevation of tracks in Milwaukee, Wis., from Kinnickinnick avenue to Fowler street, and from Clinton street to First avenue, 1.4 miles, was finished on 30 per cent and it will take about two years to complete the work which includes the elimination of 14 grade crossings. Considerable progress has been made in connection with the elevation of tracks on the Chicago & Evanston division from Montrose avenue to Howard avenue, Chicago, 4.4 miles. Of the total work 30 per cent is finished, and it will probably take about two years to complete this work, which will eliminate 36 grade crossings. The line from Lewistown, Mont., to Great Falls, 137 miles, was completed and opened for operation early in September, 1914. The grading of the Choteau line, from Great Falls, Mont., to Agawam, 70 miles, is completed, but track laying has been temporarily suspended. Construction work on the Newwood River line, a logging road extending 18.25 miles northwesterly from Merrill, Wis., was completed and the line was placed in operation in December, 1914. The construction of the Snoqualmie tunnel at the summit of the Cascade mountains was completed, and the tunnel placed in operation in June, 1915.

**CUDAHY PACKING COMPANY'S LINE.**—Cameron, Joyce & Co., Kansas City, Mo., has been awarded a contract by the Cudahy Packing Company for grading, bridge construction and track laying from Fowler, Kan., to silicate beds, eight miles distant.

**DOVER, MILLERSBURG & WESTERN (ELECTRIC).**—Grading will soon be begun on this road, which will extend from Canal Dover, Ohio, to Millersburg, a distance of 37 miles. Ben George, secretary and treasurer, Canal Dover, Ohio; D. F. A. Wheelock, chief engineer, Warren, Pa.

**ERIE.**—This company plans to carry out the double-tracking work and grade reduction for which surveys have been made

on about 36 miles in Lake, Porter and La Porte counties, Indiana, as soon as the work is authorized. This work when finished will complete the double-tracking of the Chicago & Erie. (December 18, p. 1165.)

**KINSTON BELT LINE.**—Incorporated in North Carolina with \$25,000 capital to build a belt line of steam railroad around the city of Kinston, N. C., and an electric car line through the city streets. The lines are to carry both passengers and freight. The incorporators are J. T. Deal, M. L. German, W. S. Spottswood and G. V. Cowper.

**LAKE ERIE & EASTERN.**—Double tracking work on about two miles of this road has been authorized to be carried out this year.

**LUCERNE & AURELIA CROWN.**—It is planned to begin work in the spring of 1916 on this line from Lucerne, Wash., to Aurelia Crown Mines, 16 miles. The final survey is now in progress and the average grade is to be less than 3 per cent. There will be six or seven bridges with an average length of from 50 to 60 ft. each and one tunnel about 400 ft. long. Among the structures contemplated in connection with the road are two stations, a warehouse, machine shop and wharf on Lake Chelan. The railway will serve the Aurelia Crown Company, by which it will be controlled, and its principal traffic will be about 2,000 tons of ore per day down grade and machinery and supplies for the mine up grade. O. Robert Dahl, president, Box 187, Seattle, Wash.

**NEW YORK, CHICAGO & ST. LOUIS.**—On September 1 this road began an extensive grade elimination project in Cleveland, Ohio, under the direction of A. J. Himes, engineer of grade-crossing elimination. The program includes the depression of tracks from Fulton road to Detroit avenue—a distance of about two and one-half miles, the construction of a four-track roadbed, and the erection of 13 reinforced concrete bridges and numerous retaining walls. About 1,600 tons of steel and 43,000 cu. yd. of concrete will be utilized, 750,000 cu. yd. of material will be removed from the excavations and 25,000 cu. yd. filled in at the street approaches. The work is being done by company forces, and will cost in the neighborhood of \$2,900,000.

**NEW YORK SUBWAYS.**—The War Department having granted a satisfactory form of permit for the construction of a tunnel under the East river from Fourteenth street, New York, in the borough of Manhattan, to North Seventh street, in the borough of Brooklyn, bids for the construction of the tunnel will probably be asked for in the near future.

**PHILADELPHIA & READING.**—An officer writes regarding the report that this company will build a short line from Wilmington, Del., to a point opposite the du Pont Powder Company's plant at Carney Point, N. J., that the matter is under way, but nothing definite has yet been decided upon.

**POND FORK RAILWAY.**—See Chesapeake & Ohio.

**SOUTH DAKOTA SHORT LINE.**—Incorporation has been asked for in South Dakota by this company with a capital of \$2,000,000 to build a railway from Mitchell, S. D., northwest to Pierre, 130 miles. The proposed line will pass through the counties of Davison, Aurora, Jerauld, Buffalo, Hyde and Hughes. The farmers along the proposed route have been asked to subscribe to stock. G. W. Adams, Council Bluffs, Iowa, is the promoter. N. Johnson, Mount Vernon, S. D., A. J. Hughes, J. E. Ziebach, F. E. Swartout and J. Jorgenson, Gann Valley; G. M. Schumway, and E. H. Scott, Letcher, are directors.

**SOUTHERN RAILWAY.**—Contracts have been let for second track work between Greenville, S. C., and Easley, 11.5 miles, it is said, to H. J. Dunavant & Co., Knoxville, Tenn., and from Easley to Central, 15 miles, to M. M. Elkan, Macon, Ga.

**SOUTHWESTERN LIGHT, POWER & RAILWAY.**—Contracts have been given to the Arbuckle Construction & Improvement Company to build this line, also for constructing a power station at Davis and repair shops at Arbuckle. The company was organized recently in Texas with a capital of \$12,000,000 to build an interurban electric line between Denison, Tex., and Oklahoma City, Okla., about 176 miles. W. T. Croslen, president; W. P. Woolsep, general manager, Oklahoma City, Okla. (Sept. 17, p. 547.)



WRIGHTSVILLE, ADRIAN & LYONS.—The rights and property of this company were recently sold to F. J. Garbutt, Sandersville, Ga., and it is said that the new owner will complete and operate the line. The company was organized to build from Wrightsville, Ga., southeast via Adrian to Lyons, about 40 miles, with a number of extensions. Grading work was finished in 1910 on about 35 miles.

## RAILWAY STRUCTURES

BROOKLYN, N. Y.—The New York Public Service Commission, First district, will open bids on October 26 for the station finish construction of 11 stations on the New Utrecht avenue elevated railroad between Tenth avenue and Coney Island in the borough of Brooklyn.

BUFFALO, N. Y.—The Delaware, Lackawanna & Western has filed plans for the construction of a power station on Ohio street, in connection with the new passenger station now under construction.

CHICAGO, ILL.—Officers of the Chicago Union Station Company appeared before the Illinois Public Utilities Commission on September 21, at a hearing in support of their petition for an order authorizing the issuance of \$50,000,000 first mortgage, 4½ per cent gold bonds for 50 years, to purchase land and construct the proposed new Union station, and for an order approving the operating agreement between the roads that will own the terminal.

COLUMBIA, S. C.—A contract has been given by the Seaboard Air Line to Jonas & Garretson, Columbia, for building a reinforced concrete bridge over Blanding street, in Columbia. The bridge will be about 110 ft. long, and will cost about \$15,000.

DURANGO, IOWA.—The Chicago Great Western is building a bridge here consisting of three 70-ft. through plate girders, resting on two concrete piers and two concrete abutments. The work is being done by company forces and the estimated cost is \$25,000.

FREEPORT, ILL.—The Illinois Central is planning to build three washroom buildings for the benefit of its shop employees, carmen, enginemen and firemen. The buildings will contain lavatories and individual lockers, and shower baths will be provided for the enginemen and firemen. The structures will be brick and will represent a total cost of about \$20,000.

GRASS VALLEY, CAL.—The shop building of the Nevada County Narrow Gauge recently damaged by fire is being rebuilt. The estimated loss is \$30,000.

GREENVILLE, N. J.—The Pennsylvania Railroad has given a contract to Henry Steers, Incorporated, New York, to build the new pier at Greenville (September 24, p. 586).

KANSAS CITY, KAN.—This municipality has granted the Kansas Southern a 20-year franchise which carries with it obligations in connection with future viaducts at Fifth, Seventh and Twelfth streets, and a bridge over the Kansas river to meet the requirements of the Kaw Valley Drainage District. It is doubtful whether any of this work will be begun within the next year.

NEW HOOPER, WASH.—The Oregon-Washington Railroad & Navigation Company will build a bridge over the Palouse river consisting of three 70-ft. through plate girder spans on concrete piers and abutments. Substructure bids were received by S. Murray, acting chief engineer, until September 20.

OELWEIN, IOWA.—The Chicago Great Western freight house, the contract for which was reported in our issue of last week as having been let to the Black Hawk Construction Company, of Waterloo, Iowa, will be a two-story brick structure, with reinforced concrete floors, columns and roof. The Barton spider-web flat-slab type of floor and roof construction will be used. The dimensions will be 100 ft. by 100 ft. and the estimated cost about \$22,000.

TIPTON, IND.—The Lake Erie & Western is constructing a concrete machine shop, 40 ft. by 120 ft. to replace the building destroyed by fire some time ago.

## Railway Financial News

CHICAGO, MILWAUKEE & ST. PAUL.—See editorial comments elsewhere in this issue on the annual report.

CHESAPEAKE & OHIO.—See editorial comments elsewhere in this issue on the annual report.

CHICAGO, ROCK ISLAND & PACIFIC.—H. U. Mudge, president and co-receiver of the Chicago, Rock Island & Pacific, has resigned as receiver and has been appointed chief executive officer for the receiver, Jacob M. Dickinson remaining sole receiver. Mr. Dickinson gave out the following statement in regard to Mr. Mudge's resignation and new appointment:

"I knew nothing about Mr. Mudge's resignation until I saw it in the paper this morning on my arrival from Memphis. It was a great surprise and a matter of deep personal regret to me.

"The ground upon which he put it, the fact of it becoming my duty to sue him and other directors, was one for him to determine. It should, however, be understood that there was a marked differentiation between him and most of the other directors, in that the transaction for which he voted as a director was presented and acted upon at a meeting at which he was elected a director, and immediately after his election, and also in that he was not a stockholder either of the Rock Island Company of New Jersey or the Chicago, Rock Island & Pacific Railroad Company of Iowa.

"As soon as I heard of the resignation of Mr. Mudge I went to Judge Carpenter and stated that I would regard it as a misfortune to those interested in the Rock Island lines for Mr. Mudge to resign unless he would consent to remain in charge of the operation of the road under the receiver. Judge Carpenter expressed the hope that his services could be retained. Mr. Mudge agreed to continue his services."

DELAWARE & HUDSON.—The New York Public Service Commission has been asked to authorize an issue of \$14,451,000 5 per cent 20-year convertible bonds of the Delaware & Hudson to be dated October 1, 1915. The proceeds from the sale of these bonds are to be used to retire \$13,973,000 4 per cent convertible debentures due June 15, 1916. Authority is also asked for the issue of stock to provide for the conversion of the bonds.

HOCKING VALLEY.—See editorial comments elsewhere in this issue on the annual report.

MISSOURI, KANSAS & TEXAS.—A protective committee has been formed for the first and refunding 4 per cent bonds consisting of Alexander J. Hemphill, chairman of the board of the Guaranty Trust Company; Charles A. Peabody, president of the Mutual Life Insurance Company; W. A. Day, president of the Equitable Life Assurance Society; E. S. Marston, president of the Farmers' Loan & Trust Company, all of New York, and A. A. Jackson, vice-president of the Girard Trust Company, Philadelphia. Protective committees are also being formed for the general mortgage 4½ per cent bonds by the New York Trust Company and for the second mortgage 4 per cent bonds by the Union Trust Company, New York.

See editorial comments elsewhere in this issue on the appointment of C. E. Schaff, president, as receiver.

PENNSYLVANIA RAILROAD.—The New Jersey Public Utilities Commission has approved of the consolidation of the Camden & Burlington County, the Vincentown branch of the Burlington County Railroad, and the Mount Holly, Lumberton & Medford under the corporate title of the Camden & Burlington County Railroad. All of these companies are subsidiaries of the Pennsylvania.

COKE REPLACING COAL IN SWEDEN.—Sweden's importation of German coke is reported as exceptional recently. It is caused by the high prices of coal in England and the freights. Many Swedish steamers as well as state and private railroads are now using coke, either alone or mixed with coal or wood, with apparently good results as coke imports are continually increasing.—*Iron Age*.

[ADVERTISEMENT.]

## ANNUAL REPORTS

## THE CHESAPEAKE AND OHIO RAILWAY COMPANY, THIRTY-SEVENTH ANNUAL REPORT

RICHMOND, VA., September 16, 1915.

## TO THE STOCKHOLDERS:

The Thirty-seventh Annual Report of the Board of Directors, for the fiscal year ended June 30, 1915, is herewith submitted.

The average mileage operated during the year by The Chesapeake and Ohio Lines was 2,369.2 miles, an increase over the previous year of 23.4 miles. The mileage at the end of the year was 2,371.7 miles, an increase of 4.3 miles over mileage on June 30, 1914.

## RESULTS FOR THE YEAR

Operating Revenues were.....	\$39,464,036.99
(Increase \$2,004,173.10, or 5.35%.)	
Operating Expenses were.....	27,556,413.50
(Increase \$1,142,514.99, or 4.33%.)	
Net Operating Revenue was.....	\$11,907,623.49
(Increase \$861,658.11, or 7.80%.)	
Taxes were.....	1,349,496.96
(Increase \$18,562.07, or 1.39%.)	
Operating Income, Taxes deducted, was.....	\$10,558,126.53
(Increase \$843,096.04, or 8.69%.)	
Miscellaneous Income was.....	1,018,219.08
(Decrease \$1,126,431.18, or 52.52%.)	
Rentals and Other Payments were.....	814,767.13
(Decrease \$138,449.99, or 14.52%.)	
Income for the year available for interest was.....	\$10,761,578.48
(Decrease \$144,885.15, or 1.33%.)	
Interest (75.25% of amount available) amounted to.....	8,098,041.86
(Increase \$163,394.02, or 2.06%.)	
Net Income for the year, equivalent to 4.24% on capital stock outstanding, amounted to.....	\$2,663,536.62
(Decrease \$308,279.17, or 10.37%.)	
Dividend paid during the year: One dividend of 1%.....	627,816.00
Remainder .....	\$2,035,720.62

## FINANCIAL

The changes in funded debt in the hands of the public during the year were as follows:

	Retired
4 per cent. Big Sandy Ry. First Mortgage Bonds.....	\$82,000.00
4 per cent. Coal River Ry. First Mortgage Bonds.....	36,000.00
4 per cent. Greenbrier Ry. First Mortgage Bonds.....	20,000.00
4 per cent. Raleigh & Southwestern Ry. First Mortgage Bonds .....	23,000.00
Equipment Trust Obligations.....	1,514,392.00
Decrease .....	\$1,675,392.00
Other changes in obligations shown under funded debt on Balance Sheet of June 30, 1915, were:	

	Increase	Payments
5 per cent. First Lien and Improvement Mortgage Bonds .....	\$3,147,000.00	
6 per cent. Equipment Contracts—General Equipment Co. ....		\$16,800.00
5 per cent. Equipment Contract—Standard Steel Car Co.....		583,252.23
5 per cent. Equipment Contract—Central Locomotive and Car Works.....	159,750.00	56,537.15
6 per cent. Equipment Contract—American Locomotive Co. ....	147,300.00	104,876.60
	\$3,454,050.00	\$761,465.98
Net Increase .....	2,692,584.02	

The five per cent. First Lien and Improvement Mortgage Bonds were issued during the year for additions and betterments and other capital purposes. The entire issue of these bonds, \$40,270,000 face amount, is pledged as collateral for your Company's Five Year 5% Secured Gold Notes, no part of the unissued notes having been sold during the year.

Mention was made in last year's report of the sale of your Company's holdings of the capital stock of The Kanawha and Michigan Railway Company. The transaction was completed October 7, 1914, netting your Company a profit of \$1,119,315.50, which sum was transferred to Surplus. The proceeds of the sale were deposited with the Trustee under the First Lien and Improvement Mortgage and will be re-invested in improvements and investments, which is permitted under that Mortgage.

Your Company acquired during the year 479 shares of the Capital Stock of The Chesapeake and Ohio Northern Railway Company and additional shares of stock of White Sulphur Springs, Incorporated, and of Logan and Southern Railway Company. Additional First Mortgage Bonds of Elkhorn and Beaver Valley Railway Company were acquired at par in reimbursement for advances made for construction purposes.

Further shares of stock and First Mortgage Bonds of The Chesapeake and Ohio Railway Company of Indiana were issued in respect of the cost of certain additions and betterments made to that line and were pledged under your Company's First Lien and Improvement Mortgage.

A statement of charges to property accounts will be found on page 16, showing a net addition of \$3,024,127.55; that is, \$1,045,134.97 was added to cost of road and \$1,978,992.58 was added to cost of equipment.

A schedule of securities owned June 30, 1915, will be found on page 17.

During the past six years your Company's increase in capital liabilities in hands of the public, its principal acquisitions of stocks and bonds of other companies, and its expenditures for equipment branch line construction, second track and other additions and betterments, have been as follows:

CAPITAL OBLIGATIONS ISSUED OR ASSUMED:	PAR VALUE.
General Mortgage 4½% Bonds.	\$3,716,000.00
First Consolidated Mortgage 5% Bonds .....	2,000,000.00
Convertible 4½% Debentures.	31,390,000.00
Three Year 4½% Collateral Trust Notes .....	25,000,000.00
One Year 5% Collateral Trust Notes .....	3,500,000.00

Five Year 5% Collateral Trust Notes .....	\$33,000,000.00
Coal River Railway Co. First Mortgage 4% Bonds.....	3,000,000.00
Raleigh and Southwestern Railway Co. First Mortgage 4% Bonds .....	860,000.00
Big Sandy Railway Co. First Mortgage 4% Bonds.....	229,000.00
Virginia Air Line Railway Co. First Mortgage 5% Bonds...	900,000.00
Equipment Trust Certificates Series N. ....	1,700,000.00
Equipment Contracts .....	4,084,390.00
	\$109,379,390.00
Realizing .....	\$103,796,715.00

## Less: CAPITAL OBLIGATIONS PAID OR PURCHASED:

Peninsula Division First Mortgage 6% Bonds matured January 1, 1911.....	\$2,000,000.00
Greenbrier and New River Railroad Co. First Mortgage 5% Bonds redeemed February 1, 1911 .....	339,000.00
General Funding and Improvement Mortgage 5% Bonds...	7,302,000.00
Greenbrier Railway Co. First Mortgage 4% Bonds retired November 1, 1911.....	2,000.00
Three Year 4½% Collateral Trust Notes .....	25,000,000.00
One Year 5% Collateral Trust Notes .....	3,500,000.00
Equipment Trust Payments..	10,967,000.00
Through Sinking Funds:	
Big Sandy Railway Co. First Mortgage 4% Bonds.....	326,000.00
Coal River Railway Co. First Mortgage 4% Bonds.....	157,000.00
Greenbrier Railway Co. First Mortgage 4% Bonds.....	118,000.00
Raleigh and Southwestern Railway Co. First Mortgage 4% Bonds .....	38,000.00
	\$49,749,000.00

Costing .....	50,032,740.58
	\$53,763,974.42

## ACQUISITIONS:

Stocks of:	
The C. & O. Railway Co. of Indiana .....	\$5,948,800.00
Elkhorn and Beaver Valley Railway Co. ....	30,000.00
The Gauley and Meadow River Railroad Co. ....	116,300.00
The Hocking Valley Railway Co. ....	7,671,800.00
The Kanawha and Michigan Railway Co. ....	4,029,200.00
Logan and Southern Railway Co. ....	292,100.00
Levisa River Railroad Co. (of Ky.) .....	50,000.00
The Levisa River Railroad Co. (of Va.) .....	50,000.00
Kanawha Bridge and Terminal Co. ....	400,000.00
The Silver Grove Land and Building Co. ....	200,000.00
White Sulphur Springs, Incorporated .....	2,550,000.00
First National Bank Building Corporation (Richmond, Va.)	180,000.00
The Chesapeake and Ohio Northern Railway Co.....	47,900.00
Miscellaneous .....	12,300.00
	\$21,578,400.00

Costing .....	\$21,808,546.39
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Bonds of:	
The C. & O. Railway Co. of Indiana First Mortgage 5%..	\$6,774,000.00
Elkhorn and Beaver Valley Railway Co. First Mortgage 5% .....	1,026,000.00
	\$7,800,000.00

Costing .....	6,496,200.00
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Properties of:	
Coal River Railway Co.....	\$2,304,359.88
Raleigh and Southwestern Railway Co. ....	816,562.42
Virginia Air Line Railway Co.	1,071,947.12
Costing .....	4,192,869.42

Construction of:	
Extensions of Branch Lines, costing .....	\$1,557,707.90
Second Track (173.1 miles) and Additions and Betterments, costing .....	15,081,219.47
(Excluding \$2,214,490.08 ex-	16,638,927.37



pendent on Chicago Line to April 30, 1915, for which securities have been acquired.)

## Equipment:

Additional equipment acquired less retireals .....	\$18,865,092.67
(Excluding \$33,248.59 expended on Chicago Line to April 30, 1915, for which securities have been acquired.)	
Costing .....	\$68,001,635.85

## GENERAL REMARKS

The equipment inventory as of June 30, 1915, was as follows:

Locomotives owned .....	605	Inc.	19
Locomotives leased .....	212	Dec.	27
Total .....	817	Dec.	8
Passenger train cars owned .....	358	Dec.	8
Passenger train cars leased .....	29	....	..
Total .....	387	Dec.	8
Freight train and miscellaneous cars owned .....	23,911	Inc.	1,603
Freight train cars leased .....	22,435	Dec.	387
Total .....	46,346	Inc.	1,216

The changes during the year in the accrued depreciation of equipment account were as follows:

Balance to credit of account June 30, 1914 .....	\$4,212,541.93
Amount credited during year ended June 30, 1915, by charges to:	
Operating expenses .....	\$786,491.51
Charges to account for:	
Accrued depreciation on equipment retired during year—20 locomotives, 6 passenger, 1,060 freight and work cars .....	\$92,227.62
Accrued depreciation on cars changed in class during year .....	2,526.15
	94,753.77
Balance to credit of account June 30, 1915 .....	\$4,904,279.67

	1915	1914		
Operating Revenues				
amounted to .....	\$39,464,036.99	\$37,459,863.89	Inc.	\$2,004,173.10
Net Operating Revenue .....	\$11,907,623.49	\$11,045,965.38	Inc.	\$861,658.11
Operating Ratio .....	69.8%	70.5%	Dec.	.7%
Tons of Revenue Freight carried one mile .....	8,138,347,516	7,064,650,082	Inc.	1,073,697,434
Revenue train load, tons .....	906	870	Inc.	36
Revenue tons per loaded car .....	32.3	30.9	Inc.	1.4

New industries were established during the year as follows: 16 manufactories of farm implements and farm products, 15 manufactories of lumber products, and 30 manufactories of mineral, metal and other products. At the close of the year there were 215 companies organized for producing coal and coke on your Company's lines, with a total of 338 separate mines, of which 319 were in actual operation. Of the 1,219 coke ovens 445 were in blast, and of the 10 iron furnaces, having a total daily capacity of 1,490 tons, 6 are in operation, with a total daily capacity of 950 tons of pig iron. 214 new settlers located in your Company's territory during the year, these settlers having purchased 49,011 acres of land from private parties, with an investment of \$1,288,811.

An extension of Pine Creek Branch of Logan and Southern Railway, eight-tenths of a mile, has been completed.

The construction of about thirty miles of the Chesapeake and Ohio Northern Railway has been begun, during the year, from a point near Edgington, Kentucky, to a point near Waverly, Ohio, on the Norfolk and Western Railway, including a steel bridge across the Ohio River, which is expected to be completed in the fall of 1916. Arrangements have been concluded by The Chesapeake and Ohio Northern Railway Company with the Norfolk and Western Railway Company by which trackage rights are secured over the Norfolk and Western Railway from a connection near Waverly, Ohio, to the line of the Hocking Valley Railway at Valley Crossing near Columbus, Ohio, which provides a through route from your Company's main line to the line of the Hocking Valley Railway.

The revenue coal and coke tonnage was \$21,325,742, an increase of 10.8 per cent; other revenue freight tonnage was 8,722,712, an increase of 3.0 per cent. Total revenue tonnage was 30,048,454 tons, an increase of 8.4 per cent. Freight revenue was \$31,288,536.62, an increase of 8.4 per cent. Freight train mileage was 8,979,417 miles, an increase of 10.6 per cent. Revenue ton miles were 8,138,347,516, an increase of 15.2 per cent. Ton mile revenue was 3.84 mills, a decrease of 6.1 per cent. Revenue per freight train mile was \$3.484, a decrease of 2.0 per cent. Revenue tonnage per train mile was 906 tons, an increase of 4.1 per cent; including Company's freight, the tonnage per train mile was 962 tons, an increase of 3.8 per cent. Tonnage per locomotive, including Company's freight, was 870 tons, an increase of 5.2 per cent. Revenue tonnage per loaded car was 32.3 tons, an increase of 4.5 per cent. Tons of revenue freight carried one mile per mile of road were 3,435,061, an increase of 14.1 per cent.

There were 6,487,803 passengers carried, a decrease of 0.1 per cent. The number carried one mile was 269,379,558, a decrease of 7.6 per cent. Passenger revenue was \$5,696,088.37, a decrease of 6.6 per cent. Revenue per passenger per mile was 2.115 cents, an increase of 1.1 per cent. Number of passengers carried one mile per mile of road was 113,700, a decrease of 8.5 per cent. Passenger train mileage was 5,008,603, a decrease of 4.2 per cent. Passenger revenue per train mile was \$1.137, a decrease of 2.5 per cent; including mail and express, it was \$1.345, a decrease of 1.7 per cent. Passenger service train revenue per train mile was \$1.375, a decrease of 1.8 per cent.

There were 7,353.2 tons of new rails (3,054.1 tons 100-lb. and 4,299.1 tons 90-lb.) equal to 49.8 track miles, used in renewal of existing main tracks. 2,252 tons of relaying rail were laid in various parts of the line, with an aggregate expenditure of \$29,359.00. 13,500 tons of 100 lb., 3,500

tons of 90 lb. and 500 tons of 125 lb. rail were purchased after July 1, 1915, a portion of which has been laid prior to the date of this report.

The average amount expended for repairs per locomotive operated was \$3,013.29; per passenger train car \$920.85; per freight train car \$81.88.

Mr. Frank A. Vanderlip resigned as a director and member of the Executive Committee on August 20, 1914, and Mr. Charles E. Graham was elected a director and member of the Executive Committee on that date to succeed Mr. Vanderlip.

The Board renews its acknowledgment to the officers and employees for faithful and efficient services performed during the year.

By order of the Board of Directors.

GEO. W. STEVENS,

President.

FRANK TRUMBULL,  
Chairman.

## THE CHESAPEAKE AND OHIO LINES

## GENERAL INCOME ACCOUNT

For Year ended June 30, 1915, and Comparison with Year ended June 30, 1914.

Table 2.

	1915	1914	Increase or Decrease	Per Cent
OPERATING REVENUES:				
Freight Traffic .....	\$31,288,536.62	\$28,866,516.16	\$2,422,020.46	8.4
Passenger Traffic ..	5,696,088.37	6,098,058.96	—\$401,970.59	6.6
Transportation of				
Mails .....	438,666.73	426,967.03	11,699.70	2.7
Transportation of				
Express .....	602,911.91	636,785.75	—33,873.84	5.3
Miscellaneous .....	1,437,833.36	1,431,535.99	6,297.37	.4
Total Transportation				
Revenues .....	\$39,464,036.99	\$37,459,863.89	\$2,004,173.10	5.4
OPERATING EXPENSES:				
Maintenance of Way and Structures ..	\$4,694,522.17	\$4,149,457.27	\$545,064.90	13.1
Maintenance of				
Equipment .....	8,243,170.36	7,827,659.53	415,510.83	5.3
Traffic .....	650,406.20	669,283.00	—18,876.80	2.8
Transportation ..	12,896,078.82	12,532,329.07	363,749.75	2.9
Miscellaneous				
Operations .....	232,347.26	248,347.38	—16,000.12	6.4
General .....	873,882.70	986,822.26	—112,939.56	11.4
Transportation for				
Investment-Cr. ..	33,994.01	.....	33,994.01	....
Total Operating Expenses .....	\$27,556,413.50	\$26,413,898.51	\$1,142,514.99	4.3
Net Operating Revenue .....	\$11,907,623.49	\$11,045,965.38	\$861,658.11	7.8
INCOME FROM OTHER SOURCES:				
Hire of Equipment ..	\$77,632.04	\$684,832.80	—\$607,200.76	88.7
Interest from Investments and Accounts .....	635,345.97	1,168,027.93	—532,681.96	45.6
Miscellaneous .....	305,241.07	291,789.53	13,451.54	4.6
	\$1,018,219.08	\$2,144,650.26	—\$1,126,431.18	52.5
Gross Income .....	\$12,925,842.57	\$13,190,615.64	—\$264,773.07	2.0
DEDUCTIONS FROM GROSS INCOME:				
Interest on Debt ..	\$8,098,041.86	\$7,934,647.84	\$163,394.02	2.1
Taxes .....	1,349,496.96	1,330,934.89	18,562.07	1.4
Rentals Leased				
Roads, Joint				
Tracks, &c. ....	860,074.09	835,077.32	24,996.77	3.0
Loss on C. & O.				
Grain Elevator ..	88,696.23	62,616.28	—151,312.51	241.7
Miscellaneous .....	43,389.27	55,523.52	—12,134.25	21.9
Total Deductions ..	\$10,262,305.95	\$10,218,799.85	\$43,506.10	.4
NET INCOME .....	\$2,663,536.62	\$2,971,815.79	—\$308,279.17	10.4
Amount to credit of Profit and Loss June 30, 1914 .....			\$1,561,833.39	
Amount of Net Income for year ended June 30, 1915, transferred to Profit and Loss .....			2,663,536.62	
			\$4,225,370.01	
Deduct:				
Dividend No. 32 of 1% paid December 31, 1914 .....			627,816.00	
			\$3,597,554.01	
Balance of Discount on Five Year Secured Gold Notes sold previous year and expenses in connection with bonds and notes issued ..			\$1,647,679.44	
Refunds under West Virginia two cent fare law .....			1,637.50	
Settlement of judgment in McKell Suit .....			125,000.00	1,774,316.94
				\$1,823,237.07
Add:				
Profit on Kanawha and Michigan Ry. Co. Stock, Sold .....			\$1,119,315.50	
Sundry adjustments .....			4,987.26	1,124,302.76
Balance to credit of Profit and Loss June 30, 1915 .....			\$2,947,539.83	

## GENERAL BALANCE SHEET

June 30, 1915.

ASSETS		LIABILITIES	
(Excluding Stocks and Bonds owned of The C. & O. Ry. Co. of Indiana and of The C. & O. Equipment Corporation.)		(Excluding Stocks and Bonds owned of The C. & O. Ry. Co. of Indiana and of The C. & O. Equipment Corporation.)	
<b>PROPERTY INVESTMENT:</b>		<b>CAPITAL STOCK.</b>	
Cost of Road.....	\$171,906,286.05	Common .....	\$62,792,600.00
Cost of Equipment.....	49,911,903.17	First Preferred .....	3,000.00
	\$221,818,189.22	Second Preferred .....	200.00
Accrued Depreciation of Equipment—		Common—The Chesapeake and Ohio	\$62,795,800.00
Cr. ....	4,904,279.67	Railway Co. of Indiana.....	1,200.00
	\$216,913,909.55		\$62,797,000.00
<b>SECURITIES OF PROPRIETARY, AFFILIATED AND CONTROLLED COMPANIES—</b>		<b>FUNDED DEBT.</b>	
<b>PLEGDED.</b>		First Mortgage, Kineon Coal Co., 5%	
Stocks—See Schedule, page 18.....	\$11,049,599.44	Bonds .....	\$200,000.00
Bonds—See Schedule, page 18.....	3,098,112.01	Secured Gold Notes, 5%.....	33,000,000.00
	\$14,147,711.45	First Mortgage, Terminal, etc., 6%	142,000.00
<b>SECURITIES—ISSUED OR ASSUMED—PLEGDED.</b>		Bonds .....	1922
Bonds—See Schedule, page 18.....	40,270,001.00	General Funding and Improvement,	1929
(Includes First Lien and Improve-		5% Bonds .....	3,698,000.00
ment Mortgage 5% Bonds \$40,270,-		Convertible, 4½% Bonds.....	31,390,000.00
000.00. See Contra.)	\$54,417,712.45	First Mortgage, R. & S. W. Railway,	1930
<b>MISCELLANEOUS INVESTMENTS.</b>		4% Bonds .....	862,000.00
Physical Property .....	305,424.09	First Consolidated Mortgage, 5%	1936
<b>SPECIAL FUNDS, AND FUNDED DEBT ISSUED AND RESERVED.</b>		Bonds .....	1939
Potts Creek Branch—Cash.....	\$43,641.27	First Mortgage, Craig Valley Branch,	1939
Raleigh and Southwestern Railway Co.		5% Bonds .....	650,000.00
Bonds authenticated in advance of		First Mortgage, Greenbrier Railway,	1940
construction .....	40,000.00	4% Bonds .....	1,801,000.00
Special Deposits account of Construc-		First Mortgage, Warm Springs Branch,	1940
tion .....	4,086,710.42	5% Bonds .....	400,000.00
(Includes Cash and Notes—Proceeds		First Mortgage, Big Sandy Railway, 4%	1941
K. & M. Ry. Co. Stock Sale.)..	4,170,351.69	Bonds .....	4,674,000.00
	58,893,488.23	First Mortgage, Paint Creek Branch,	1944
	\$275,807,397.78	4% Bonds .....	539,000.00
<b>WORKING ASSETS.</b>		First Mortgage, Coal River Railway,	1945
Cash in Treasury.....	\$578,788.86	4% Bonds .....	2,843,000.00
Cash in Transit.....	957,752.12	First Mortgage, Potts Creek Branch,	1945
Cash deposits to pay Interest and		4% Bonds .....	600,000.00
Dividends .....	354,577.80	First Mortgage, Va. Air Line Railway,	1946
Cash deposit to pay Equipment Trust		5% Bonds .....	900,000.00
Principal .....	112,000.00	First Mortgage, R. & A. Division, 4%	1952
Cash deposits to pay Matured Bonds		Bonds .....	6,000,000.00
and Scrip .....	11,174.17	Second Mortgage, R. & A. Division, 4%	1989
Cash deposit to pay Taxes.....	103,488.59	Bonds .....	1,000,000.00
Loans and Bills Receivable.....	158,860.82	General Mortgage, 4½% Bonds. 1992	48,129,000.00
Traffic Balances .....	879,409.96		\$166,686,000.00
Agents and Conductors.....	1,003,709.43	Equipment Trust Obligations and Con-	6,413,163.21
Miscellaneous Accounts Receivable.....	878,817.47	tracts .....	\$173,099,163.21
Other Working Assets.....	37,301.32	First Lien and Improvement Mort-	40,270,000.00
	\$5,075,880.54	gage, 5% Bonds (see Contra)..1930	\$276,166,163.21
Materials and Supplies.....	2,581,952.18		
<b>SECURITIES IN TREASURY—UNPLEGDED.</b>		<b>WORKING LIABILITIES.</b>	
Stocks—See Schedule, page 17.....	\$4,764,403.45	Loans and Bills Payable.....	\$95,000.00
Bonds—See Schedule, page 17.....	1,543,903.00	Traffic Balances .....	409,645.46
	6,308,306.45	Audited Vouchers and Pay Rolls....	3,737,859.15
<b>DEFERRED ASSETS.</b>		Unpaid Wages.....	45,985.51
Unmatured Interest, Dividends and		Miscellaneous Accounts Payable....	292,756.72
Rents .....	\$75,147.61	Matured Interest and Dividends Un-	381,832.65
Advances to Proprietary, Affiliated and		paid .....	11,174.17
Controlled Companies .....	99,961.90	Matured Mortgage and Secured Debt	69,573.37
Advances, Working Funds (Fast Freight		Unpaid .....	
Lines, etc.) .....	37,675.93	Other Working Liabilities.....	\$5,043,827.03
Special Deposits with Trustees, Vari-			
ous Mortgage Funds.....	94,770.99	<b>DEFERRED LIABILITIES.</b>	
Cash and Securities in Sinking and		Unmatured Interest and Rents.....	\$1,889,997.36
Redemption Funds.....	51,167.24	Taxes Accrued .....	1,332,088.02
Cash and Securities in Insurance Re-		Sundry Accounts .....	131,916.16
serve Fund .....	9,971.41		3,354,001.54
Sundry Accounts .....	387,488.42		\$8,397,828.57
	756,183.50		
	14,722,322.67	<b>APPROPRIATED SURPLUS.</b>	
		Additions to Property through Income	
		since June 30, 1907.....	\$2,984,365.23
		Reserve Invested in Sinking Fund...	23,852.20
		Reserve Invested in Other Reserve	9,971.41
		Funds .....	\$3,018,188.84
			2,947,539.83
		<b>PROFIT AND LOSS—BALANCE.....</b>	
			\$5,965,728.67
Total .....	\$290,529,720.45	Total .....	\$290,529,720.45

This Company is also liable as a guarantor of the following securities in hands of the public—  
 The Chesapeake and Ohio Grain Elevator Co., First Mortgage 4% Bonds due 1938..... \$820,000.00  
 The Chesapeake and Ohio Northern Railway Co., 5% Gold Notes due 1915..... 500,000.00  
 Norfolk Terminal and Transportation Co., First Mortgage 5% Bonds due 1948..... 500,000.00  
 Western Pocahontas Corporation, First Mortgage 4½%

Bonds due 1945..... \$750,000.00  
 Western Pocahontas Corporation Extension Mortgage No. 1, 4½% Bonds due 1945..... 83,000.00  
 Western Pocahontas Corporation, Extension Mortgage No. 2, 4½% Bonds due 1946..... 51,000.00  
 Louisville and Jeffersonville Bridge Co. Mortgage (C. & O. prop'n, ½) 4% Bonds due 1945..... 4,500,000.00  
 Richmond-Washington Co. Collateral Trust Mortgage (C. & O. prop'n, ½) 4% Bonds due 1943..... 10,000,000.00

## THE HOCKING VALLEY RAILWAY COMPANY SIXTEENTH ANNUAL REPORT

COLUMBUS, Ohio, September 16, 1915.

To the Stockholders:

The Sixteenth Annual Report of the Board of Directors, for the fiscal year ended June 30, 1915, is herewith submitted.  
 The average mileage operated during the year was 351.7 miles, an increase over the previous year of .2 miles. The mileage at the end of the year was 351.1 miles. See schedule on page 8.

## RESULTS FOR THE YEAR

Operating Revenues were..... \$6,181,152.97  
 (Decrease \$839,992.10 or 11.96%)  
 Operating Expenses were..... 4,184,370.00  
 (Decrease \$619,376.51 or 12.89%)  
 Net Operating Revenue was..... \$1,996,782.97  
 (Decrease \$220,615.59 or 9.95%)  
 Taxes were..... 418,522.15  
 (Decrease \$32,614.12 or 7.23%)

Operating Income, Taxes deducted, was..... \$1,578,260.82  
 (Decrease \$188,001.47 or 10.64%)  
 Miscellaneous Income was..... 292,890.78  
 (Decrease \$156,029.12 or 34.76%)  
 Rentals and Other Payments were..... \$1,871,151.60  
 (Decrease \$79,640.09 or 71.79%)  
 Income for the year available for interest was..... 31,298.34  
 (Decrease \$264,390.50 or 12.56%)  
 Interest (73.18% of amount available) amounted to..... \$1,839,853.26  
 (Increase \$197,947.83 or 17.24%)  
 Net Income for the year amounted to..... 1,346,450.88  
 (Decrease \$462,338.33 or 48.37%)  
 Dividends paid during the year:  
 One dividend of 3%..... \$329,985.00  
 One dividend of 1%..... 109,995.00  
 Remainder .....



## FINANCIAL

The changes in funded debt shown by balance sheet of June 30, 1915, as compared with June 30, 1914, consisted in the annual payments of \$496,000 on equipment trusts, and in the retirement of \$4,000,000 face amount one-year 5% gold notes by the issue and sale of \$4,000,000 face amount one-year 6% gold notes maturing November 1, 1915.

The District Court of the United States for the Southern District of Ohio, Eastern Division, in a suit brought by the Attorney General of the United States, enjoined your Company and others from owning and controlling any interest in the Sunday Creek Company, a corporation all the stock of which had been acquired in the interest of your Company and The Toledo and Ohio Central Railway Company, the stock owned by your Company having been pledged under its First Consolidated Mortgage. The stock was accordingly sold for \$50,000, of which amount \$43,136.87 was received by the Trustee under this Company's First Consolidated Mortgage in lieu of the stock released. The Court entered an order on December 10, 1914, approving this sale of the stock and the refunding of debentures of the Sunday Creek Company held by the railroads by the delivery by the purchaser of a like par amount of general mortgage bonds of that Company.

An analysis of the property accounts will be found on pages 12 and 13, by reference to which it will be seen that additions and betterments were made during the year to the net amount of \$164,243.29, due to \$831,826.15 added to cost of equipment, and to \$230,624.20 added to and \$898,207.06 deducted from cost of road, this deduction being made necessary because of the sale—referred to in the last annual report—of the old dock property on the west side of the Maumee River at Toledo to the Pennsylvania Company.

During the past six years your Company's net addition to property accounts has been as follows:

Equipment .....	\$3,763,008.90
Additions and Betterments .....	2,592,162.82
	\$6,355,171.72

## GENERAL REMARKS

The equipment in service June 30, 1915, consisted of:  
Locomotives owned..... 148  
Locomotives leased under equipment trusts..... 8

Total locomotives .....	156	No change	
Passenger train cars owned.....	86	No change	
Freight train and miscellaneous cars owned.....	9,680	Increase	25
Freight train cars leased under equipment trusts.....	5,346	Increase	790
Freight train cars under special trust.....	47	Increase	47

Total freight train cars..... 15,073 Increase 862  
The changes during the year in accrued depreciation of equipment account were as follows:

Balance to credit of account June 30, 1914.....	\$1,019,628.37
Amount credited during year ended June 30, 1915, by charges to operating expenses .....	\$212,304.92
Charges to account for:	
Accrued depreciation on equipment retired during year—81 freight and work cars.....	\$4,221.35
Accrued depreciation on cars changed in class during year.....	282.86
	4,504.21
	207,800.71
Balance to credit of account June 30, 1915.....	\$1,227,429.08

The strike by coal miners in the Hocking district, referred to in the last annual report, extended into August of this fiscal year, which, combined with the general business depression throughout the year and with the loss of traffic as a result of the sale by The Chesapeake and Ohio Railway Company of its stock interest in The Kanawha and Michigan Railway Company, brought about a loss of freight traffic and revenues as follows:

	1915.	1914.	Decrease.
Tons of revenue freight carried one mile .....	1,171,899,998	1,315,425,895	143,525,897
Operating revenues .....	\$6,181,152.97	\$7,021,145.07	\$839,992.10
Net operating revenue.....	\$1,996,782.97	\$2,217,398.56	\$220,615.59

The Chesapeake and Ohio Northern Railway Company is constructing a bridge across the Ohio River near Sciotoville, Ohio, and a line of railroad which connects the main line of The Chesapeake and Ohio Railway Company with the Norfolk and Western Railway near Waverly, Ohio, and it has obtained trackage rights over the Norfolk and Western Railway from that point to Valley Crossing, near Columbus, Ohio, where it will connect with the tracks of your Company. It is expected that this line will be completed before January 1, 1917.

The revenue train load increased from 1,000 to 1,035 tons, and revenue tons per loaded car from 36.9 to 37 tons.

The new dock and terminal yard on the east side of the Maumee River at Toledo has been in use throughout the year, and the yard now consists of 17.7 miles of track with a working capacity of 1,600 cars. The Kerrs Run extension of the Pomeroy Belt Railway, 1.6 miles, to the new mine of the Peacock Coal Company, was completed. The old light 80-ft. double track girder bridge at Sugar Grove was replaced by a modern heavy 90-ft. bridge of similar type.

The revenue coal and coke tonnage was 6,271,163 tons, a decrease of 14.4%; other revenue freight tonnage was 2,842,376 tons, a decrease of 10.2%. Total revenue tonnage was 9,113,539 tons, a decrease of 13.1%. Freight revenue was \$4,912,982.33, a decrease of 12.3%. Freight train mileage was 1,132,206 miles, a decrease of 13.9%. Revenue ton miles were 1,171,899,998, a decrease of 10.9%. Ton mile revenue was 4.19 mills, a decrease of 1.6%. Revenue per freight train mile was \$4.339, an increase of 1.9%. Revenue tonnage per train mile was 1,035 tons, an increase of 3.5%; including Company's freight, the tonnage per train mile was 1,068 tons, an increase of 3.1%. Tonnage per locomotive, including Company's freight, was 922 tons, an increase of 2.3%. Revenue tonnage per loaded car was 37 tons, an increase of .3%. Tons of revenue freight carried one mile per mile of road were 3,352,101, a decrease of 11%.

There were 1,810,037 passengers carried, a decrease of 16.1%. The number of passengers carried one mile on steam trains was 44,267,279, a decrease of 10%. Passenger revenue was \$832,733.36, a decrease of 8.5%. Revenue per passenger per mile of steam trains was 1.844 cents, an increase of 2.2%. The number of passengers carried on steam trains one mile per mile of road was 125,867, a decrease of 10.1%. Passenger train mileage of steam trains was 708,859, a decrease of 9%. Passenger revenue per train mile of steam trains was \$1.152, an increase of 1.1%; including mail and express it was \$1.311, an increase of 1.2%. Passenger service train revenue per train mile was \$1.371, an increase of 1.6%.

There were 1,196 tons of new 100-lb. rails, equal to 7.6 track miles, and 811 tons of new 90-lb. rails, equal to 5.7 track miles, used in the renewal of existing main tracks.

The average amount expended for repairs per locomotive was \$1,940.75; per passenger train car \$462.54; per freight train car \$35.58.

Appreciative acknowledgment is hereby made of efficient services during the year of officers and employees.

By order of the Board of Directors.

GEO. W. STEVENS,  
President.

FRANK TRUMBULL,  
Chairman.

## GENERAL BALANCE SHEET, JUNE 30, 1915.

ASSETS.		
Property Investment.		
Cost of Road.....	\$28,918,587.52	
Cost of Equipment.....	14,452,155.75	
General Expenditures .....	17,571.70	
	\$43,388,314.97	
Accrued Depreciation of Equipment—Cr..	1,227,429.08	\$42,160,885.89
Securities of Proprietary, Affiliated and Controlled Companies—Pledged.		
Stocks .....	\$ 108,088.66	
Bonds .....	300,000.00	408,088.66
Securities of Proprietary, Affiliated and Controlled Companies—Miscellaneous—Unpledged .....		23,503.44
Other Investments.		
Miscellaneous Investments—Securities—Pledged .....		761,500.00
		\$43,353,977.99
Working Assets.		
Cash .....	\$ 832,779.71	
Loans and Bills Receivable.....	82,315.36	
Traffic Balances .....	47,790.34	
Agents and Conductors.....	419,581.84	
Miscellaneous Accounts Receivable.....	351,417.06	
Other Working Assets.....	24,208.21	\$ 1,758,092.52
		763,292.15
Materials and Supplies.....		
Securities in Treasury—Unpledged.		
Stocks .....	\$ 501.00	
Bonds .....	1,843,675.00	1,844,176.00
Deferred Assets:		
Unmatured Interest .....	\$ 6,265.31	
Advances to Proprietary, Affiliated and Controlled Companies .....	53,698.66	
Advances, Working Funds.....	910.05	
Insurance paid in advance.....	2,437.17	
Cash and Securities in Sinking and Redemption Funds .....	29,128.58	
Cash and Securities in Insurance Reserve Fund .....	36,859.14	
Other Deferred Debit Items.....	66,141.69	195,440.60
		\$4,561,001.27
Total .....		\$47,914,979.26
LIABILITIES.		
Capital Stock .....		\$11,000,000.00
Funded Debt.		
First Consolidated Mortgage 4½% Bonds, 1999 .....	\$16,030,000.00	
First Mortgage C. & H. V. R. R. 4% Bonds, 1948 .....	1,401,000.00	
First Mortgage Cols. & Tol. R. R. 4% Bonds, 1955 .....	2,441,000.00	
One Year 6% Gold Notes, 1915.....	4,000,000.00	\$23,872,000.00
Equipment Trust Obligations.....		2,327,000.00
		\$26,199,000.00
Working Liabilities.		
Loans and Bills Payable.....	\$ 1,100,000.00	
Traffic Balances .....	455,141.86	
Audited Vouchers and Wages Unpaid....	840,682.18	
Miscellaneous Accounts Payable.....	59,757.09	
Matured Interest, Dividends and Rents Unpaid .....	371,109.00	
Other Working Liabilities.....	4,659.40	\$ 2,831,349.53
Deferred Liabilities.		
Unmatured Interest, Dividends and Rents Payable .....	\$ 137,170.01	
Taxes Accrued .....	263,500.00	
Operating Reserves .....	11,792.60	
Other Deferred Credit Items.....	147,968.26	560,430.87
		\$3,391,780.40
Appropriated Surplus.		
Additions to Property through Income since June 30, 1907.....	\$ 181,409.11	
Funded Debt Retired through Income and Surplus .....	131,331.90	
Reserve Invested in Sinking Fund.....	817.52	
Reserve Invested in Insurance Fund.....	36,859.14	\$ 350,417.67
PROFIT AND LOSS—BALANCE.....		\$ 6,973,781.19
		\$ 7,324,198.86
Total .....		\$47,914,979.26

This Company, jointly with the Toledo and Ohio Central Railway Company, guaranteed in 1901 5% First Mortgage Bonds of the Kanawha and Hocking Coal and Coke Company due 1951 (\$2,842,000 outstanding), and in 1902 5% First Mortgage Bonds of the Continental Coal Company due 1952 (\$1,569,000 outstanding). The Ohio courts, in quo warranto proceedings in which bondholders were not represented, have pronounced these guaranties *ultra vires*.

## THE FIFTY-FIRST ANNUAL REPORT OF THE DIRECTORS OF THE CHICAGO, MILWAUKEE &amp; ST. PAUL RAILWAY COMPANY

To the Stockholders:

FOR THE FISCAL YEAR ENDING JUNE 30, 1915

The directors submit to the stockholders the following report of the operations of the Company for the year ending June 30, 1915, and of the condition of its property and finances at the close of that year.

The operations for the year show the following results:

Operating revenues	\$91,435,374.26
Operating expenses	61,971,701.03
Net operating revenue	\$29,463,673.23
Taxes accrued	4,746,721.21
Operating income	\$24,716,952.02
Other income:	
Interest on bonds	\$ 342,257.36
Dividends on stocks	515,191.00
Int. on other securities, loans and accounts.	1,974,565.02
Rents—received	487,987.73
Miscellaneous	329,711.97
	3,649,713.08
Gross corporate income	\$28,366,665.10
Deductions:	
Interest accrued on funded debt	\$14,636,297.91
Rents—paid	871,503.67
Hire of equipment	173,808.97
Miscellaneous	716,772.05
	16,398,382.60
Net corporate income	\$11,968,282.50

## ACQUISITION OF THE GREAT FALLS TERMINAL RAILWAY

The railway of the Great Falls Terminal Railway Company was constructed at Great Falls, Montana, as a terminal facility of the Great Falls-Lewistown Line. There are 3.45 miles of this railway, all of which has been electrified and is being operated very economically with electric locomotives. It was deemed advisable, both on account of economy and efficiency in operation, to take over these terminals and make them a part of the St. Paul System.

Accordingly, the Great Falls Terminal Railway Company conveyed all of its railway property and franchises to this Company by deed dated November 5th, 1914, since which date this Company has operated such railway as a part of its system and as the owner thereof.

## SEATTLE, PORT ANGELES &amp; WESTERN RAILWAY

The Seattle, Port Angeles & Western Railway, the outstanding capital stock of which is all owned by this Company, has under active construction a line of railway extending from Fairmount, Jefferson County, Wash., westerly through Port Angeles to Earles, a point in Clallam County, Wash., a distance of approximately 62 miles. That portion of the line west of Port Angeles, approximately 24 miles, has been completed and was placed in operation in January, 1915.

This line taps the rich timber country of the Olympic Peninsula and is proving to be an excellent feeder for the St. Paul System.

## MILES OF TRACK, JUNE 30, 1915

Owned solely by this Company:	
Main track	9,617.22
Second main track	1,023.50
Third main track	21.72
Fourth main track	13.11
Connection tracks	46.98
Yard tracks, sidings and spur tracks	3,104.48
	13,827.01
Owned jointly, with other Companies:	
Main track	103.45
Second main track	6.14
Third main track	1.94
Fourth main track	1.93
Connection track	5.92
Yard tracks, sidings and spur tracks	175.34
	294.72
Used by this Company under contracts:	
Main track	354.94
Second main track	76.47
Third main track	1.14
	432.55
Total miles of track	14,554.28
Average miles of main track in operation during the year:	
Owned solely	9,603.62 miles
Owned jointly	103.36 "
Used under contracts	345.60 "
Total average miles operated	10,052.58 miles
The lines of road of this Company are located in the following States:	
Wisconsin	1,823.59 miles
Illinois	415.04 "
Iowa	1,868.61 "
Minnesota	1,244.90 "
North Dakota	379.93 "
South Dakota	1,794.89 "
Missouri	140.27 "
Michigan	179.98 "
Montana	1,056.11 "
Idaho	197.37 "
Washington	619.98 "
Total length of main track owned solely and jointly	9,720.67 miles

## EQUIPMENT

During the year twenty-five locomotives and forty cars of various classes have been purchased or built, as follows:

25 Locomotives	3 Observation Sleeping Cars
1 Dining Car	4 Parlor Cars
2 Mail and Baggage Cars	2 Observation Parlor Cars
2 Passenger and Baggage Cars	2 Cafe Observation Cars
10 Passenger Cars	1 Track Scale Test Car
13 Sleeping Cars	

During the year eleven locomotives and one thousand four hundred and

sixty-one cars of various classes were destroyed by wreck or fire, sold or taken down on account of small capacity, as follows:

11 Locomotives	26 Refrigerator Cars
1 Passenger Car	2 Refrigerator Express Cars
1 Passenger and Baggage Car	2 Vegetable Cars
1 Mail and Baggage Car	15 Ballast Cars
1117 Box Cars	13 Caboose Cars
68 Stock Cars	22 Cinder Dump Cars
179 Flat and Coal Cars	5 Work Train Cars
9 Ore Cars	

The original cost of the equipment retired has been credited to Property Investment—Road and Equipment.

## PROPERTY INVESTMENT—ROAD AND EQUIPMENT

Equipment	\$818,501.82
Purchase of Great Falls Terminal Ry.	855,902.47
New Branch Lines and Extensions	2,074,731.86
New Additional Main Tracks and Reducing Grade and Perfecting Line	4,461,992.91
Other Additions and Betterments	7,737,238.07
	\$15,948,367.13
Credit—Property retired or converted	4,451,350.23
Total as shown by detailed statement on page 38 of this report	\$11,497,016.90

## IMPROVEMENTS AUTHORIZED

## EQUIPMENT

Authority has been given for the purchase or building of additional equipment, as follows:

7 Sleeping-Observation Cars.  
2 Lounging-Observation Cars  
also to convert 231 forty thousand pounds capacity box cars into cinder-dump cars.

## ADDITIONAL MAIN TRACKS

The construction of the second main track and grade reduction work on the Chicago and Council Bluffs Division in Iowa was completed on June 30th, 1915, between Green Island and Manilla, Iowa, a distance of 270 miles. On account of unfavorable business conditions, it was deemed advisable to temporarily suspend the work on the Hastings and Dakota Division, but the work has been resumed and 178.70 miles were completed and placed in operation June 30th, 1915.

On June 30th, 1915, the following new sections of second main track were completed and placed in operation:

Chicago and Council Bluffs Division in Iowa:	
One mile east of Delmar to Lost Nation, Iowa	12.80 miles
Eloerion to Capron, Iowa	40.46 "
Coon Rapids to Manilla, Iowa	31.90 "
Total	85.16 miles
Hastings and Dakota Division:	
Hopkins to Cologne, Minn.	23.87 miles
Minnesota Falls to Gt. Northern Tower, Minn.	5.80 "
West of Montevideo, Minn., to Double Track Switch	10.09 "
Total	39.76 miles

## AUTOMATIC BLOCK SIGNALS

During the year ending June 30th, 1915, installations of automatic block signals have been completed, as follows:

La Crosse Division:	
Portage to North La Crosse, Wis.	104.1 miles
River Division:	
Bridge Switch to Minnesota City, Minn.	30.5 "
Hastings and Dakota Division:	
Summit to one mile east of Milbank, S. D.	23.1 "
Chicago and Council Bluffs Division in Iowa:	
Green Island to Capron, Iowa	152.9 "
Slater to Coon Rapids, Iowa	51.8 "
Idaho Division:	
Center Street, Spokane, to Northern Pacific Crossing	1.4 "
Spokane	

Since June 30th automatic signals have also been placed in service on the Chicago and Council Bluffs Division in Iowa, between Coon Rapids and Manilla. These installations comprise a total of 395.2 miles and make the automatic block practically continuous from Chicago to Minneapolis and from Chicago to Manilla.

The installation of automatic signals on the Hastings and Dakota Division from Hopkins to Cologne, Minnesota, a distance of 21.5 miles, is now in progress and will be completed in the near future.

The installation of automatic signals on the Rocky Mountain Division from Butte Yard to Finlen, a distance of 16 miles, has been authorized, and work will be started in the near future.

## ELIMINATION OF GRADE CROSSINGS

The work of depressing the tracks of the Hastings and Dakota Division, from Hiawatha avenue to Hennepin avenue, in the city of Minneapolis, a distance of about three miles, was somewhat delayed during the past year. It includes the elimination of thirty-seven grade crossings. On June 30th, 1915, however, the work was about 64% completed, and it is planned to complete all of this work during the season of 1916.

The elevation of the tracks along the Bloomingdale Road, in the city of Chicago, which includes the elimination of 35 grade crossings and extends for a distance of 2.4 miles, was about 95% completed on June 30th, 1915.

The elevation of tracks in the city of Milwaukee has been somewhat delayed during the past fiscal year. This work extends from Kinickinnick avenue to Fowler street, and from Clinton street to First avenue, a distance of 1.4 miles, and on June 30th, 1915, was 30% completed. It is estimated that it will take at least two years to complete this work, and when completed 14 grade crossings will have been eliminated in that city.

Considerable progress has been made in connection with the elevation of tracks on the Chicago and Evanston Division from Montrose avenue to Howard avenue, Chicago, a distance of 4.4 miles, and on June 30th, 1915, this work was 30% completed. It will probably take at least two years to complete this track elevation work which will eliminate 36 grade crossings.

## NEW LINES AND EXTENSIONS

The line of railway from Lewistown to Great Falls, Montana, a distance of 137 miles, was completed and opened for operations early in September, 1914.

The grading of the Choteau Line, extending from Great Falls to Agawam, Montana, a distance of 70 miles, is completed, but track laying has been temporarily suspended.



Construction work on the Newwood River Line, a logging road, extending 18.25 miles northwesterly from Merrill, Wis., was completed and the line placed in operation in December, 1914.

#### TUNNELS

The construction of the Snoqualmie Tunnel, at the summit of the Cascade Mountains, was completed and the tunnel placed in operation on January 17th, 1915. The opening of this tunnel shortens the main line of the Coast Division 3.6 miles, eliminates interruptions from snow slides, and also eliminates 6.4 miles of ruling grade.

#### ELECTRIFICATION

The electrification of the Puget Sound Lines, which was commenced in April, 1914, has made such progress that the line between Deer Lodge and Three Forks, a distance of 114.4 miles, will be ready for full electric operation during the Spring of 1916. The electrification of the second division, between Three Forks and Harlowton, a distance of 114.2 miles, was commenced in April, 1915, and it is probable that this division will be ready for operation early in 1917.

#### RESERVE FOR ACCRUED DEPRECIATION

At the close of the fiscal year, ending June 30th, 1914, there was at the credit of Reserve for Accrued Depreciation the sum of \$6,398,789.90.

A certain percentage of the total cost of equipment, aggregating \$1,376,091.46, has been credited to this Reserve for the estimated depreciation of locomotives, passenger train cars, freight train cars and work train cars accrued during the year.

There has been charged to this Reserve an amount of \$177,816.39, representing the accrued depreciation, previously credited, on locomotives and cars destroyed, sold or taken down.

The balance of this Reserve, June 30th, 1915, as shown on page 24, is \$7,597,064.97, which represents the estimated depreciation of rolling stock subsequent to June 30th, 1907.

#### CAPITAL STOCK

At the close of the last fiscal year the share capital of the Company amounted to \$233,130,300.00 and consisted of \$116,855,400.00 of Common Stock and \$116,274,900.00 of Preferred Stock. It has been increased during this fiscal year by \$506,000.00 of Common Stock issued and sold. The total amount of Capital Stock at the close of this fiscal year is \$233,636,300.00, of which \$434,400.00 is held by the Company.

#### FUNDED DEBT

At the close of the last fiscal year the Funded Debt of the Company was \$486,881,154.66.

It has been decreased during the fiscal year by \$4,748,000.00 Terminal Mortgage bonds retired.

The amount of bonds at the close of this fiscal year is \$482,133,154.66, of which \$123,893,800.00 are in the Treasury of the Company and \$358,239,354.66 are outstanding.

#### TREASURY BONDS

At the close of the last fiscal year the amount of the Company's bonds in its treasury was \$153,572,500.00.

It has been decreased as follows:

General and Refunding Mortgage 4½% bonds sold.....	\$589,000.00
General and Refunding Mortgage 5% Convertible bonds sold	29,089,700.00
Total decrease .....	\$29,678,700.00
	=====

At the close of this fiscal year bonds in treasury amounted to \$123,893,800.00, as follows:

General and Refunding Mortgage Bonds, available for the acquisition of additional property or for other additions and betterments .....	\$107,310,800.00
Bonds certified by trustees, to reimburse the Company for expenditures from earnings for additional property acquired, for other additions and betterments and available for such corporate purposes as the Board of Directors may authorize: General and Refunding Mortgage Bonds.....	\$16,424,000.00
General Mortgage Bonds.....	159,000.00
Total .....	\$123,893,800.00

#### OPERATING REVENUES

The Operating Revenues for the year were \$91,435,374.26—a decrease of \$2,178,325.72 compared with the previous year.

The revenue from freight traffic was \$63,953,798.62—69.95% of total revenue—a decrease of \$1,361,956.17, or 2.09%.

The number of tons of freight carried was 32,959,392—a decrease of 47,885 tons, or .14%.

The following classes of commodities show an increase compared with the previous year: Products of Agriculture, 580,423 tons; Products of Animals, 205,829 tons; Products of Mines, 559,555 tons. The following commodities show a decrease: Products of Forests, 545,140 tons; Manufactures, 404,937 tons, and Commodities Not Specified, 443,615 tons.

The number of tons of all agricultural products carried during the year was 7,742,673 tons—an increase compared with the previous year of 8.10%. Agricultural products comprised 23.49% of the total tonnage carried, compared with 21.70% of the total tonnage of last year.

The number of tons of commodities other than agricultural products carried during the year was 25,216,719 tons—a decrease compared with the previous year of 628,308 tons, or 2.43%—the per cent of the total being 76.51% against 78.30% last year.

The number of tons of revenue freight carried one mile was 8,185,988,375—an increase of 106,298,870, or 1.32%. The revenue per ton per mile was .7813 cent—a decrease of .0265 cent, or 3.28%. The average miles each ton of revenue freight was carried was 248.37 miles—an increase of 3.58 miles, or 1.46%.

The number of tons of revenue freight carried per loaded car was 16,835, against 16,498 last year—an increase of 2.04%. The number of tons of revenue freight per freight and mixed train mile was 390.21, against 379.78 last year—an increase of 2.75%. The revenue from freight per freight and mixed train mile was \$3.0486, as against \$3.0678 last year—a decrease of .63%.

The revenue from passenger traffic during the year was \$17,952,428.18—19.63% of the total revenue—a decrease of \$1,008,796.40, compared with the previous year, or 5.32%.

The number of passengers carried was 16,065,456—a decrease of 360,560, or 2.20%. The number of passengers carried one mile was 858,452,321—a decrease of 53,923,494, or 5.91%.

The revenue per passenger per mile was 2.091 cents—an increase of .013 cent, or .63%. The average miles each passenger was carried was 53.43 miles—a decrease of 2.11 miles, or 3.80%.

#### OPERATING EXPENSES

The Operating Expenses for the year were \$61,971,701.03, a decrease of \$918,600.21, compared with the previous year.

The expenses of Maintenance of Way and Structures were \$10,377,184.60; Maintenance of Equipment, \$13,737,535.32; Traffic Expenses, \$1,756,800.69; Transportation Expenses, \$35,697,961.43; Miscellaneous, \$722,635.21; General Expenses, \$1,862,938.89; and Transportation for Investment—Cr., \$2,183,355.11.

There was an increase in Maintenance of Equipment of \$112,439.68; in General Expenses of \$198,859.92 (due largely to the additional help required in preparing statistics for the Western Advance Rate Passenger and Freight Cases before the Interstate and State Commissions) and Transportation for Investment—Cr., \$364,889.50.

There was a decrease in Maintenance of Way and Structures of \$344,915.08; in Traffic Expenses of \$42,820.78; in Transportation Expenses of \$1,150,972.29; and in Miscellaneous Operations of \$56,081.16.

During the year 39 steel bridges, aggregating 2,980 feet in length, and 12 masonry bridges, aggregating 1,603 feet in length, were built—replacing 4,026 feet of wooden bridges, 407 feet of iron bridges and 150 feet of embankment; and 19,025 feet of wooden culverts were replaced with iron and concrete pipe. About 3 miles of pile bridges were filled with earth, 44 bridges having been completely filled and 43 reduced in length by filling.

#### SUBSIDIARY COMPANIES

The operation for the fiscal year of the Subsidiary Companies named below show the following results:

These companies are operated independently, and their Revenues and Expenses are not included in the statement of the Chicago, Milwaukee & St. Paul Railway Company, shown on page 7 of this report.

##### TACOMA EASTERN RAILROAD COMPANY

Operating Revenues .....	\$405,162.20
Operating Expenses .....	322,050.46
Net Operating Revenue .....	\$83,111.74
Taxes Accrued .....	48,775.02
Operating Income .....	\$34,336.72
Rents Received .....	\$23,289.45
Hire of Equipment .....	46,658.17
Miscellaneous .....	337.89
	70,285.51
Gross Corporate Income .....	\$104,622.23
DEDUCTIONS:	
Interest Accrued on Funded Debt .....	\$44,200.00
Interest paid Chicago, Milwaukee & St. Paul Ry. Company .....	140,166.71
Non-Operating Property Expenses .....	29,390.71
Rents Paid .....	900.00
Miscellaneous .....	213.25
	214,870.67
Net Corporate Deficit .....	\$110,248.44
	=====

##### BELLINGHAM & NORTHERN RAILWAY COMPANY

Operating Revenues .....	\$197,716.04
Operating Expenses .....	146,233.90
Net Operating Revenue .....	\$51,482.14
Taxes Accrued .....	24,483.51
Operating Income .....	\$26,998.63
OTHER INCOME:	
Rents Received .....	\$7,058.71
Hire of Equipment .....	4,634.28
Sinking Fund .....	838.57
	12,531.56
Gross Corporate Income .....	\$39,530.19

DEDUCTIONS:	
Interest Accrued on Funded Debt .....	\$29,425.00
Sinking Fund .....	16,836.25
Hire of Equipment .....	2,815.00
Rents Paid .....	2,305.00
Miscellaneous .....	159.92
	51,541.17
Net Corporate Deficit .....	\$12,010.98
	=====

##### GALLATIN VALLEY RAILWAY COMPANY

Operating Revenues .....	\$113,614.70
Operating Expenses .....	88,772.81
Net Operating Revenue .....	\$24,841.89
Taxes Accrued .....	13,434.25
Gross Corporate Income .....	\$11,407.64
DEDUCTIONS:	
Interest paid Chicago, Milwaukee & St. Paul Ry. Company .....	\$93,300.00
Hire of Equipment .....	14,144.40
	107,444.40
Net Corporate Deficit .....	\$96,036.76
	=====

MILWAUKEE TERMINAL RAILWAY COMPANY	
Operating Revenues .....	\$148,877.99
Operating Expenses .....	102,927.51
Net Operating Revenue.....	\$45,950.48
Taxes Accrued .....	8,446.83
Operating Income .....	\$37,503.65
Rents Received .....	1,999.05
Gross Corporate Income.....	\$39,502.70
DEDUCTIONS:	
Interest paid Chicago, Milwaukee & St. Paul Ry. Company .....	\$41,699.71
Hire of Equipment.....	2,873.75
Non-operating Property Expenses.....	963.47
Rents Paid .....	570.54
Net Corporate Deficit.....	\$6,604.77

BIG BLACKFOOT RAILWAY COMPANY	
Operating Revenues .....	\$57,327.61
Operating Expenses .....	30,824.56
Net Operating Revenue.....	\$26,503.05
Taxes Accrued .....	2,057.93
Operating Income .....	\$24,445.12
Income from Non-Operating Property.....	1,277.66
Gross Corporate Income.....	\$25,722.78
DEDUCTIONS:	
Interest paid Chicago, Milwaukee & St. Paul Ry. Company .....	\$26,513.94
Hire of Equipment.....	13,896.73
Rents Paid .....	3,296.79
Net Corporate Deficit.....	\$17,984.68

For details of operation, reference is made to the statements of the General Auditor, appended hereto.

By order of the Board of Directors.  
August, 1915

A. J. EARLING, President.

## GENERAL BALANCE SHEET

ASSETS—JUNE 30TH, 1915	
PROPERTY INVESTMENT:	
Road and Equipment.....	\$564,740,361.95
Reserve for Accrued Depreciation—Cr.	7,597,064.97
	\$557,143,296.98
Securities:	
Securities of Controlled Companies—Unpledged:	
Stocks .....	\$9,026,833.90
Funded Debt .....	5,541,000.00
	14,567,833.90
Other Investments:	
Advances to Controlled Companies for Construction, Equipment and Betterments .....	\$34,993,758.54
Miscellaneous Investments:	
Physical Property .....	620,741.89
Investment Securities—Unpledged.....	47,582.05
	35,662,082.48
TOTAL CAPITAL ASSETS.....	\$607,373,213.36
WORKING ASSETS:	
Cash .....	\$15,426,097.28
Traffic and Car-Service Balances.....	17,961.28
Due from Agents and Conductors.....	2,264,099.83
Miscellaneous Accounts Receivable.....	3,402,908.76
Materials and Supplies.....	8,258,191.89
Other Working Assets.....	160,272.08
	29,529,531.12
ACCRUED INCOME NOT DUE:	
Unmatured Interest .....	570,334.99
DEFERRED DEBIT ITEMS:	
Working Funds .....	\$166,427.79
Special Deposits .....	65,664.44
Taxes Paid applicable to period subsequent to June 30th, 1915.....	1,056,176.43
Cash and Securities in Sinking Funds....	534,521.23
Securities in Insurance Fund.....	2,818,100.00
Other Deferred Debit Items.....	2,276,504.88
	6,917,394.77
	\$644,390,474.24

LIABILITIES—JUNE 30TH, 1915	
CAPITAL STOCK:	
Common Stock:	
In Hands of Public.....	\$117,356,100.00
Held by Company.....	5,300.00
	\$117,361,400.00
Preferred Stock:	
In Hands of Public.....	\$115,845,800.00
Held by Company.....	429,100.00
	116,274,900.00
Premiums Realized on Capital Stock.....	36,183.87
Total Capital Stock.....	\$233,672,483.87
FUNDED DEBT:	
Mortgage Bonds:	
In Hands of Public.....	\$224,703,200.00
Held by Company.....	125,884,300.00
	\$350,587,500.00
Debenture Bonds:	
In Hands of Public.....	\$131,443,454.66
Held by Company.....	102,200.00
	131,545,654.66
Total Funded Debt.....	\$482,133,154.66
Total Capital Stock and Funded Debt.....	\$715,805,638.53
Less Stock and Bonds unsold, held by the Company .....	124,236,800.00
TOTAL CAPITAL LIABILITIES .....	\$591,568,838.53
WORKING LIABILITIES:	
Bills Payable .....	\$30,280.20
Traffic and Car-Service Balances.....	554,623.71
Pay Rolls and Vouchers.....	7,393,079.56
Miscellaneous Accounts Payable.....	389,248.00
Unclaimed Dividends .....	3,279.00
Interest Coupons not Presented.....	167,830.77
Matured Funded Debt.....	5,400.00
Other Working Liabilities.....	266,502.45
	8,810,243.69
ACCRUED LIABILITIES NOT DUE:	
Interest Accrued on Funded Debt.....	\$5,459,273.27
French Government Tax—European Loan of 1910 .....	832,129.93
	6,291,403.20
DEFERRED CREDIT ITEMS:	
Insurance Department Fund—Reserve....	\$2,721,272.17
Other Deferred Credit Items.....	550,730.41
	3,272,002.58
APPROPRIATED SURPLUS:	
Reserves from Income or Surplus:	
Invested in Sinking Funds.....	543,611.23
	\$610,486,099.23
PROFIT AND LOSS—BALANCE:	
Surplus .....	33,904,375.01
	\$644,390,474.24